

SALVE REGINA UNIVERSITY

DOES THE CURRENT 20TH CENTURY NAVY PERSONNEL MANAGEMENT
SYSTEM MEET 21ST CENTURY SAILORS' NEEDS?

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SALVE REGINA UNIVERSITY
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The dissertation of William Daniel Ferree entitled "Does The Current 20th Century Navy Personnel Management System Meet 21st Century Sailors' Needs?" submitted to the Department of Humanities Ph.D. Program in partial fulfillment of the requirements of the degree of Doctor of Philosophy in the Graduate School of Salve Regina University has been read and approved by the committee:

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To Sailors' - God Love Them

ABSTRACT

In the 1970's, the U.S. Navy's leadership realized it was facing impending personnel shortages. These shortages would result from the end of conscription and a nation-wide demographic projection shortfall of available male high school graduates ages 18-23 in the U.S. labor market. To lessen the effects of these changes several Department of Defense management initiatives were introduced. In the Navy these included competitive wage increases and introducing ship designs requiring fewer people by using more technology targeted to lessen repetitive labor intensive work.

A Post-Vietnam general military draw-down in the 1970's lessened recruitment and retention demands, allowing time for new economic policies and models to be developed. In the 1980's, as a military build-up began to accentuate personnel problems of recruiting and retention in an All-Volunteer Force, the validity of the economic models began to come under scrutiny. Actual severe personnel shortages in the Navy were again avoided, this time because the former Soviet Union dissolved, greatly reducing the threat of war and the consequent need for ships and personnel to operate them through the 1990's.

Technology changes in the Navy have evolved at an unforeseen pace. For example, a destroyer-size ship of the 1970's contained approximately three-hundred (300) sailors, with about ten percent (10%) of its crew in high-tech rates. A similar tasked ship being planned for operation in the 2020 timeframe is designed to operate with a total crew of one-hundred (100) sailors, but it could require up to three-quarters of the crew to be high-tech. This dramatic increase from 30 to 75 highly

skilled personnel was an unintended consequence of dramatically reducing total personnel while sharply increasing the need for high-tech personnel. It has left Navy personnel planners with only 20th century tools to manage this 21st century challenge.

A statistical examination was conducted on data gathered by the Department of Defense's 1999 Survey of Active Duty Personnel. The focus of this examination was to compare high-tech personnel with those who do more labor intense work. Results showed that high-tech personnel do not make their retention decisions based simply on monetary factors, though no doubt money and overall compensation are important to these specialized sailors. Current models are dominantly based on 20th century economic assumptions designed to recruit and retain sailors for labor intensive occupations. The current management system must move away from a primarily econometric based system to one that views personnel management issues in more holistic manner. Recommendations are made in three areas: Education, Quality of Life, and Career management.

If the nation does not desire to return to conscription or to solve military personnel issues through excessive compensation, new personnel management procedures will be required in the way these high-tech sailors are recruited, educated, and employed on ships and ashore. In sum, the Navy should make certain personnel management changes, so that high-tech sailors will be easier to recruit, happier in their period of service, and more likely to make the Navy part of their career plans.

ACKNOWLEDGEMENTS

The tragedy of September 11, 2001, namely the terrorist attacks on the World Trade Center Towers, the Pentagon, and the foiled attack that ended in a field of Pennsylvania, greatly influenced this dissertation. Having passed the age of useful military service, I still hoped to be of some benefit to the nation as it began its war on terrorism. Upon further reflection I concluded that each citizen should contribute to this effort to thwart evil in any way she or he could - so I set out to do what I could with my mind. Twenty-four years of service in the Navy with several rewarding tours in manpower management made the starting point clear. My desire was to do an honest evaluation of the current personnel system. In so doing, I hope that the Navy will accept these findings as the sincere effort of one who desires the best for its sailors and for the nation.

I could not have completed this effort without tremendous support from numerous people. To my dissertation committee and all involved with the Salve Regina University Ph.D. Program, my sincere appreciation for providing me this opportunity. To all those present and past, military and civilian, manpower professionals who have inspired my own sense of passion for personnel issues, my deepest gratitude. To those who became prayer partners and continually provided encouragement, my gratefulness. To my wife Marie and all six of our children, my love. And to the Lord Jesus Christ, my all.

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CHAPTER ONE

AN OVERVIEW

Introduction

This study examines one aspect of the complex relationship between humans and technology, namely each one's adaptation to the needs of the other. The scientific community is often seen as viewing technology as the solution to current human problems. Some within this body suggest that the faster mankind adapts to new technology the faster technology can improve the human condition. Conversely opposing groups and their writers, imply that technology has already been overly elevated in today's society and that a certain loss of humanness has been technology's sacrificial price. C.P. Snow in his work The Two Cultures and A Second Look, addressed this chasm of thought saying, "This polarization is sheer loss to us all. To us as people, and to our society" (1959, 11). Four years later after further reflection, Snow provides, in the second part of his book, an alternative view that suggests that a third culture could exist, one that would be able to bridge these diverse views.

This body of opinion seems to come from intellectual persons in a variety of fields - social history, sociology, demography, political science, economics, government (in the American academic sense), psychology, medicine, and social arts such as architecture. It seems a mixed bag: but there is an inner consistency. All of them are concerned with how human beings are living or have lived - and concerned, not in terms of legend, but of fact. I am not implying that they agree with each other, but in their approach to cardinal problems - such as the human effects of the scientific revolution, which is the fighting point of this whole affair - they display, at the least, a family resemblance. (1964, 70)

The task of the manpower manager, whether in military or civilian life, is to balance the technology needs of the organization and the human needs of the employees. How to balance properly the needs of the sailor as a human, while meeting the operator and maintainer requirements of the technologies employed in advanced war-fighting operations, is one of the thorniest issues facing the U.S. Navy's 21st century manpower management system. For the Navy to handle this challenge, it must first make an honest appraisal of its current position. The purpose of this study is to aid such an examination by concentrating on the last few decades and assessing the relevance of system changes that have already been adopted by the U.S Navy. From this baseline position, it must then be determined whether the Navy's personnel management system has adequately adapted to any revealed transformation. Only then can a determination be made on how the people need in the future should be effectively and ethically managed. This analysis will include the nation's decision to change from military conscription to an All-Volunteer Force (AVF) and how the AVF has affected the personnel management process.

Over the last fifty years, the Navy has experienced multiple external pressures, including some on the personnel system from advances in technology. In general, such advances have increased the need for technical expertise in sailors, while lowering the requirement for manual skills. Simultaneously, human social pressure became a factor as the number of males in the nation was not expected to meet conscription demands. Also increasingly there came the political demand for opening formerly closed military jobs to minorities and women. The military responded by removing involuntary service (i.e. instituting the AVF), by demanding full integration of minorities, and by opening nearly all career fields to women. To compensate personnel adequately for their voluntary

service, the Navy has introduced several new career management initiatives over the last few decades. This step has raised the standard of living for sailors on and off ships and personnel issues such as comparability of pay and quality of life continue to receive high-level management emphasis.

Even if analysis reveals that the personnel management system has properly addressed past technology infusion in the Navy, a crucial need remains to address the expected rise in demand for high tech personnel. Recent manpower studies of civilian and military personnel, should add significantly to management insights that will help the Navy meet future personnel demands. However, if one or more aspects of the Navy's personnel policies are revealed to have not adequately addressed former technology changes, then after identification of any shortfalls appropriate remedies must be included.

Although this review is directed only at the U.S. Navy, lessons learned could apply to other military services and to various civilian organizations. A book published recently by the Preventative Defense Project, Keeping the Edge: Managing Defense for the Future, prescribed numerous recommendations for the defense community. This project is a research collaboration effort of the Kennedy School of Government Harvard University and Stanford University. Observed in civilian organizations, these recommendations would help correct what the group sees as "organizational and managerial deficiencies of the national security establishment" (Carter and White 2000, ix). Since technology use is increasing in most organizations, tension exists between technology's demand for specialized expertise and humans' desire to control their lives. To keep pace technology will continue to place demands on its human operators and maintainers.

Organizations, themselves a form of technology, must provide required education and training to keep employees proficient. Corporations, which count on stable employment, were at first reluctant to provide any training and education that would make employees more desirable to their competitors. In contrast, over the last few decades, most young Americans have incorporated mobility into their career plans. When career or personal needs suggest that a change may be beneficial to the individual, today's worker will likely shift organizations, even if such a change is not a promotion. Leading corporations are adapting management policies to recognize that workers rarely expect life-long service in one company.

In civilian organizations that have adapted to workers going to and coming from similar companies, this process has become manageable. This when labeled in systems management terms is classified as an "open system." Overwhelmingly corporations assume themselves to be in an open system environment where people are free to move in and out of the company in pursuit of individual career goals. Actually a certain amount of turnover is good for any organization as it allows openings for the entry of new personnel with new ideas and a fresh look at company practices. Although in theory flows in and out of an open system could occur at any level there is generally higher turnover in newer employees and some longer serving employees are more likely to stay if they view themselves as having few options to move to other employers. Open systems are very concerned about their own organizational actions along with the cultural setting in which they operate. Great emphasis is placed in monitoring the job satisfaction level of its employees. Dissatisfaction in employees can be addressed more freely than in a closed system because there are more options. In the Navy's current closed system, a loss in

mid-level enlisted sailors and mid-grade officers is of much greater concern. A closed system is one in which personnel enter at junior levels and then promote up within the organization as they gain experience. In the Navy this closed system is further restricted in the fact that the personnel force is shaped in a pyramid manner to closely match occupational requirements set in this shape. By use of an "up or out" promotion system at each level of the pyramid personnel are either internally selected for promotion or removed totally from the organization. Lateral movements in and out of the system, which civilian businesses accept as normal, are not widely accommodated by the Navy. The Navy seems to fear having an open system where free movement in and out of the service would be common and it is likely that any change to this closed system take place gradually. Naval planners anticipate that such movement of sailors in and out of active duty pyramids would put undue pressure on the assignment system. They see this change as only in the interest of the sailor, instead of benefiting both the sailor and the Navy. Because the Navy desires to remain as a closed system it is critical that it clearly understand its future personnel needs as it is dependent on growing its own leaders. Therefore, the Navy must create the appropriate management system to be able to recruit and continually retain the proper persons to meet its future requirements. Comparisons are made in this study between the civilian management processes and current military management practices. Due to the differences of personnel management flexibility available to those in an open and closed system it will be harder for the Navy in its closed system to incorporate some recommended changes than it would be for an open system organization. The Navy must let go of some personnel management practices that seem to

be driven by two-hundred years of tradition more than they are by sound management decisions.

Organizational Adaptation to Technological Changes

Andrew F. Krepinevich, while director of The Center for Strategic and Budgetary Assessments and adjunct professor of Strategic Studies at John Hopkins in the fall of 1994, was an early commentator on military change issues. He asked, "What changes must the military make in order to move from legacy systems of the Cold War to the Military After Next?"¹

In his 1994 article, Krepinevich enhanced the debate by astutely observing that technology change is not effective in itself. It must be combined with organizational change to truly revolutionize bureaucratic processes. Krepinevich states:

It may be argued that with recent transformation periods of ten to twenty years, we are discussing a continuous military evolution rather than a revolution. But what is revolutionary is not the speed with which the entire shift from one military regime to another occurs, but rather *the recognition, over some relatively brief period, that the character of conflict has changed dramatically, requiring equally dramatic - if not radical - changes in military doctrine and organizations*. Just as water changes to ice only when the falling temperature reaches 32 degrees Fahrenheit, at some critical point the cumulative effects of technological advances and military innovation will invalidate former conceptual frameworks and demand a fundamental change in the accepted definitions and measurement of military effectiveness. When this occurs, military organizations will either move to adapt rapidly or find themselves at a severe competitive disadvantage. (Krepinevich 1994, 31 emphasis in original)

Sometimes the military organization making the changes cannot comprehend their full impact. For, example, U.S. forces expected that several organizational adaptations made in joint war-fighting techniques before the 1991 conflict against Iraq would make them more effective. However, the magnitude of the overwhelming victory against Iraq

¹ When used in this manner the author is speaking of the approximate timeframe 2025-2030.

was shocking to both sides. Despite having many modern weapon systems Iraq's grossly antiquated command structure led to the ineffective use of its new technologies.

The fact that a technology can be adapted either voluntarily or as mandated without being integrated by the organization is of great interest. As Krepinevich asserts, technology's cumulative advances eventually invalidate former conceptual frameworks, a point that resonates in this study of the Navy's personnel management system over the last few decades. This period was permeated with technological advances in equipment used by sailors and by a dramatic shift in the skill make up of personnel serving. Despite this fact, the Navy has not made any fundamental organizational changes in how it recruits, educates, and seeks to retain personnel. The Preventative Defense Project sees this lack of change as a major problem in the Department of Defense's (DOD) current management practices.

Like industry, DOD must cope with new, unfamiliar situations that require rethinking its basic mode of operations. A review of management reform implementation in the United States yields certain fundamental principles that point toward how private-sector innovations can be applied productively to a public-sector organization such as DOD. (Lippitz, O'Keefe, White, and Brown 2000, 169)

This researcher contends that an example of such a major technology change occurred in the military as a whole in 1971, when recruitment formerly done largely by conscription was replaced by the All-Volunteer Force (AVF). Because this procedural change was imposed on the military by Congress, the Navy's personnel management system chose to adjust in its recruitment, training, and retention systems in a gradual manner, rather than implement immediately any major organizational changes.

In response to this national directive to create an AVF, the Navy modified the then existing personnel system so as to recruit, train, and retain volunteers having general

characteristics found in labor intensive workers. The system as originally designed by the Navy expected to recruit mainly non-technical personnel with labor intensive skill traits who were expected to fit a restrictive pyramid billet hierarchy that anticipates low first-term retention. Organizations of the twenty-first century, however, are more likely to demand a larger group of high-tech personnel. Such high-tech organizations require a much narrower pyramid (or even stovepipe-like) structure because they generally need higher first-term (and subsequent) retention than a low-tech organization. Civilian organizations have adjusted to this change in requirements by emphasizing personnel job security, professional education, and on-site training as integral parts of their management plan.

Navy personnel managers, on the other hand, have relied upon their current system, claiming that high-tech and labor intensive personnel have few significant differences regarding their professional needs. Consequently, the Navy has continued using incentive pays and bonuses as the key management tool when recruitment or retention in any particular occupational area becomes of concern.

This dissertation evaluates the null hypothesis: "There is no difference between high-tech sailors and general detail (labor intensive) sailors in their quality of life and professional expectations." If there are no significant differences in the two groups then the Navy has made a correct choice in gradually modifying, rather than replacing, its current management system. For even if the percentage of high-tech sailors grows, its management system can continue in its adaptive style. However, if there are significant differences in the needs and professional desires of these two groups, then the Navy must

consider changing significantly its management system to recognize the shifting make-up of its work force.

The current label given to sailors in labor intensive fields i.e., general detail or "Gendets", accentuates the system's belief that personnel with nothing except general indoctrination or bootcamp) training, can fill a myriad of billets. The Navy expects to fill these jobs with only on-the-job trained personnel, much as a service business might train its entry level servers and cashiers. Like civilian businesses, the expectation is for low long-term retention and little advancement from the bulk of these entry-level employees. In an organization with mainly labor intensive positions, a pyramid billet structure and an "up or out" system has proven to be appropriate. The number of such low-tech positions in the Navy is dropping, since such labor intensive skills at sea are being replaced by technology and ashore they are often being contracted out to civilian companies. Having less personnel on ships will probably require extensive cross-functionality among high-tech sailors, requiring them to operate and maintain a large number of systems. Consequently, high-tech persons will require education and formal technical training, and the Navy cannot expect sailors to obtain it through on-the-job training.

Technology: What Is It?

Technology has always had an interface with its inventor, the human. The fact that it is common to refer to people as high-tech or low-tech in their job skills hints at technology's growing effect on human consciousness. Technology influences core assumptions about everyday life: our humanity, our symbols and our institutions. Technology moves non-human logic to center stage in our overall development.

Emile Durkheim in his seminal work, The Division of Labor in Society, struggled with the idea that technology, which brings about certain advancements to the human quality of life, may also have simultaneous deleterious effects on social order.

The question that has been the starting point for our study has been that of the connection between the individual personality and social solidarity. How does it come about that the individual, whilst becoming more autonomous, depends ever more closely upon society? How can he become at the same time more of an individual and yet more linked to society? For it is indisputable that these two movements, however contradictory they appear to be, are carried on in tandem. (1984, xxx; originally published in French in 1893)

Durkheim was convinced that education, knowledge, and technology would increase individualism, especially in the choice of labor. This division of labor seemed a likely source of the future disintegration of society. It appeared that pre-industrial societies were held together by common morals and values, but what bond, he wondered, would preserve society in technological communities? He finally concluded that technology would demand increased interaction of individuals in a society. This interaction would sometimes occur because of population density, but technology would also eliminate the need for duplication in labor skills and therefore, leading to greater specialization in careers. A technologically attuned organization would encourage job specialization, Durkheim believed, since this would be more efficient in the means of production. This occupational compartmentalization would lead to a greater dependency of the individual on the larger society for basic needs.

As specialization has increased in the Navy, technology has accelerated labor division among sailors in their occupational skills. Fewer sailors are generalists who can meet job requirements with on-the-job training. As predicted, this specialization in jobs has actually reinforced the whole system's dependency on each part. Thus, rather than

fearing specialization in the Navy and on its ships as being divisive, differences in job skills have highlighted the necessity of each sailor to depend upon all other shipmates. As technology on ships increased, general training, which in the past allowed advancement and cross-training of personnel from one area of shipboard labor to another, has significantly decreased. Even in related areas, such as engineering, a common knowledge of systems that formerly allowed a Boiler Technician (BT) and a Machinist Mate (MM) to perform some interchangeable operational and maintenance duties. Today such dual roles are rarely possible. Since each part of the labor force on a Navy ship has become more and more specialized, simultaneously reinforcing the fact that, if any one part fails to perform optimally, the functionality of all is impeded.

The Navy must recognize adequately that this diversity of talent so necessary for success at each distinct operational level of the organization (e.g. ships, submarines, aircraft squadrons, etc.) and key to its overall success, may also need to be recognized in its personnel management approach. Any personnel management system that attempts to manage people in a one-size-fits-all model will likely have difficulty in properly filling some key positions. The failure to recognize human diversity in their expectations and needs, is that at the key moment of retention, individuals could find that a long-term look at their career potential trumps other motives suggested in retention posters (such as honor, courage, and commitment). Although a common bond among sailors, the Navy also cannot rely solely on patriotism to fill its ranks.

Durkheim's writings are clear that, for society to work efficiently, inequalities would have to be removed from the system by treating persons as individuals. In 1971, John Eldridge, in his detailed study of industry entitled Sociology and Industrial Life,

concluded that failing to deal with individual needs in such a specialized society will lead to the loss of meaning in work itself, and that unrealized human desires will lead to job dissatisfaction. If any society or organization forces specialization without filling the worker's needs to feel worthwhile, the consequences will be resentment and resistance. In a free society the dissatisfied human will leave such an organization.

Thus a Navy that relies upon successful synergy of the whole, because individuals are experts in their diverse fields, must deal with perceived inequalities in such diversity. The Navy must meet individual needs through its personnel management system. The Navy's present management system relies mainly upon monetary incentives to recruit and retain personnel. The result is pay that varies widely across job skills because of signing and reenlistment bonuses. As a result, many specialization groups may feel resentment toward the greater rewards of others. An alternative would be to manage diverse job skills in other ways. A redesigned personnel system could more easily recognize the differences among individuals based on education, training, assignments, advancement, etc., rather than concentrating on short term economic incentives. A Navy personnel management approach that solely relied on economic incentives could turn counter-productive in the long term, as bonuses are often quickly exhausted by personnel whose regular paychecks continually accentuate civilian-military pay scales differences over many months of a multi-year contract. A targeted response to individual differences is appropriate, and providing a tailored indirect monetary incentive, such as tuition assistance, can be effective in some cases. The Navy must not, however, believe that bonuses are a panacea that can be used in all occasions, as this kind of single solution response is neither efficient nor effective.

The Navy's personnel management system developed in the 1970's and 1980's to deal with personnel issues relies upon humans reacting uniformly and predictably (at least in statistical terms as a replicable stochastic whole)² to economic stimulus. Personnel management was considered as a quasi-quantitative technology used in a mostly hands off manner by personnel managers. If behavior in sailors could be accurately predicted in statistical manpower models, then necessary increases and decreases in filling personnel needs could be easily implemented by manipulating economic variables. Although science is an exhibition of the power of the human mind, over-reliance on technology in management practices is doomed to fail. Such technology systems remove managers from the interpersonal process and reduce humans to "things" that are expected to operate like predictable machines. Neil Postman cites a relevant example:

John McCarthy, (is) the inventor of the term "artificial intelligence." McCarthy claims that "even machines as simple as thermostats can be said to have beliefs." To the obvious question posed by the philosopher John Searle, "What beliefs does your thermostat have?", McCarthy replied, "My thermostat has three beliefs - it's too hot in here, it's too cold in here, and it's just right in here."

What is significant about this response is that it has redefined the meaning of the word "belief." The remark rejects the view that humans have internal states of mind that are the foundation of belief and argues instead that "belief" means only what someone or something does. The remark also implies that simulating an idea is synonymous with duplicating the idea. And, most important, the remark rejects the idea that mind is a biological phenomenon.

In other words, what we have here is a case of metaphor gone mad. From the proposition that humans are in some respects like machines, we move to the proposition that humans are little else but machines and, finally, that human beings are machines. And then, inevitably, as McCarthy's remark suggest, to the proposition that machines *are* human beings. (Postman 1993, 111-2)

² For example the manpower models would expect the Enlisted Pay Grade (E-1) to move from Years of Service One (YOS-1) to YOS-2 at a continuation rate of say .937. Although reasons for not continuing in the Navy were of course individually based (e.g. death, criminal activity, administrative errors, etc.) the overall number was all that mattered. Rarely did personnel managers ask about the make-up of these rates.

Although the Navy's personnel management system does not view itself as having entirely adopted this philosophy, examination of past and present behavior does show a propensity to treat humans as entities who react uniformly to management stimulus. Seemingly, the squeaky wheel (falling retention or recruitment shortages) across all jobs and skill requirements tend to get the same oil.³ This response would stand in sharp contrast to Fredrick Herzberg's psychological studies on motivation, which dispute the ability of any incentive to motivate humans uniformly. The Navy's current personnel management system has placed scientific reasoning (in the form of manpower models) at the center of decision making, thus displacing the correct center of human individuality and sociological needs. Fritjof Capra correctly concludes that humans are facing numerous crises simultaneously, e.g., cancer, crime, pollution, toxic wastes, trash, and energy shortages. (For the military, occupational hazards and family separation are two more.) As a result most do not know which one to deal with first. Suggesting the need of a paradigm shift away from an unwavering belief in the scientific method as found in current management system's reliance on models, Capra states:

They include the belief in the scientific method as the only valid approach to knowledge; the view of the universe as a mechanical system composed of elementary material building blocks; the view of life in society as a competitive struggle for existence; and the belief in unlimited material progress to be achieved through economic and technological growth. (Capra 1988, 31)

Technology concludes that the molecules of nature must obey the laws of nature, and man is acting out the mechanical role of revelation. Such strict interpretations of the message of science would deny any role outside those of scientific methods that deal strictly in finding facts in the replicating processes. While we humans have added immeasurably to our knowledge of the physical, under this realm of technology, our

³ Econometric models will suggest through pay elasticity a targeted financial solution.

understanding of the human condition seems to be defective. The problem with relying primarily on technology in the solution to human problems is that it too often leaves human consciousness and individual desires outside the equation. As Bergman states:

The fabulous and unparalleled rise of the West to supreme power obviously cannot be neatly dated, but in a general way it did coincide with the evolution and the progressive institutionalization of the ideals of individual independence, and with the genesis of the superior technology and of the economic system that were fostered by these ideals and that in turn reinforced them.

Hence one might have to count this technology and this economic system with both their positive and their negative sides among the more distant consequences of the belief in individual freedom. ...If each person conceives himself as ringed round by a fence of rights, - then one is bound to feel isolated. (Bergmann 1987, 10)

John Kenneth Galbraith provides a key definition for this examination of technological influence. He identifies technology as "the systematic application of scientific or other organized knowledge into practical tasks." (1986, 11) The importance of this definition, in a manpower study, comes from the modeler's view that in breaking complex tasks into simple parts and allowing for specialization, we have created individual skill requirements that separate the people in each specialty from each other, and separates the people in all jobs from the central personnel managers and their management system.

Jacques Ellul uses the term "technique" rather than technology in his note to the reader of The Technological Society:

The term *technique*, as I use it, does not mean machines, technology, or this or that procedure for attaining an end. In our technological society, *technique* is the *totality of methods rationally arrived at and having absolute efficiency* (for a given stage of development) in *every* field of human activity. Its characteristics are new; the technique of the present has no common measure with that of the past. (1964, xxv.)

Ellul is much more deterministic in his view of the technological explosion than Galbraith. Ellul sees man as no longer the artisan who uses tools in a creative process. (Examples would be a hoe for a farmer, an oar for a fisherman, or a weapon for a warrior.) Instead, *technique* provides the only satisfactory answers for man (a car must go fast to provide the feeling of power, scientific research must confirm our reasoning with empirical data, and information technology will remove the uncertainty of enemy movement and intentions.) *Technique* to Ellul has taken on its own life form, and man's role in technique is an essential but definable part. Man is unable to stop *technique* without stopping his own existence.

He who serves these techniques enters another realm of necessity. This new necessity is not natural necessity; natural necessity, in fact, no longer exists. It is technique's necessity, which becomes the more constraining the more nature's necessity fades and disappears. It cannot be escaped or mastered. The tool was not false. But technique causes us to penetrate into the innermost realm of falsehood, showing us all the while the noble face of objectivity of result. In this innermost recess, man is no longer able to recognize himself because of the instruments he employs. (Ibid., 146)

Technology is pressing on the human from multiple angles, and appears to be winning the struggle with the human on who is the master and who the servant. Weaponry is a technology that has progressed over time in its ability to deliver destruction through improvements in range, warhead effectiveness, and accuracy. However, a new milestone may have been reached as weaponry is approaching a point where "it" is able to choose both its targets and its operators. The Army, in its current infusion of technology through its Land Warrior project (due for fielding in 2008), is moving even closer to seeing the human as "a weapon platform." So, the soldier's main

job may be to find, process and pass along information.⁴ In the Navy systems studied over the last few decades, the Navy made technology choices to try to lower its personnel requirements on ships. These advances came not only in weapon systems but also in general equipment technology. In addition to reducing the number of persons needed to run a ship, the Navy also changed the qualities of sailors required. Technology has removed much of the Navy's options for on-the-job training to operate ship equipment. So its former, and much wider, recruitment base is no longer feasible. Instead, higher mental abilities are required in an ever-increasing number of jobs. The U.S. Navy is slowly evolving from a corps of personnel that represented a cross-section of American citizens, to a force that demands a cadre intellectually above the norm.⁵ The personnel system that currently manages these sailors' careers has attempted evolutionary rather than revolutionary change, the result being that historic management techniques are being applied to a new generation workforce.

Greek philosophers, beginning with Thales, were men of speculative temperament. What is the world made of? What are the elements and the processes by which the world is transformed? Greek philosophy and science were born together, of the passion to know. (Boorstin 1993, 19)

Over the time of recorded history, progression in thought has followed this pattern. Man's need for social order caused the institution of laws, and having laws created a sense of the need for moral reasoning. After individual moral reasoning challenged collective logic, then scientific fact challenged logic. Technology, which challenged fact, often causes a rethinking of laws, starting the cycle over. Neil Postman summarizes the journey:

⁴ Defense News Release May 23, 2002, Washington D.C. "Pentagon Rolls Out 'Latest, Greatest Prototype' Solder System" written by Sgt. 1st Class Kathleen T. Rhem, USA

⁵ This is not to suggest that the U.S. Navy does not still have gender issues in its make-up. Technology is helping to gender neutralize personnel requirements.

It is not always clear, at least in the early stages of a technology's intrusion into a culture, who will gain most by it and who will lose most. This is because the changes wrought by technology are subtle if not downright mysterious, one might even say wildly unpredictable... New technologies change what we mean by "knowing" and "truth"; they alter those deeply embedded habits of thought which give to culture its sense of what the world is like - a sense of what is the natural order of things, of what is reasonable, of what is necessary, of what is inevitable, of what is real. (Postman 1993, 12)

Michael Foucault, a post-structuralist historian in his book, The Birth of the Clinic: An Archeology of Medical Perception, provides a fascinating example of the interplay of technology, economies, and culture. He shows how doctors, by 1816, had used language and discourse to learn a new way to see, to separate the sick organism from its disease, and to use the new scientific knowledge that they argued and wrote about.

Foucault focuses on the changing connections between what doctors are beginning to see, how they interpret their new insights, and how they manage to get these insights accepted. He points to the reforms initiated the principles of the French Revolution, which included the availability of equal medical care for all. He never imputes evil motives to an individual practitioner. Instead, he indicates how scientific explorations themselves pushed doctors to assert what they thought correct, only to be proven wrong by others whose discoveries contradicted their own (Foucault 1994, 96-105). Because, for instance, hospitals had become crowded, patient care costly and impersonal, and unsanitary conditions would infect some patients with contagious diseases, doctors began to advocate home care.

That home care, also worked to the advantage of the state, since the hospitalized sick, who were usually poor could eat the broth from the meat allocated to their healthy relatives. At the same time, as patients were cared for at home, argues Foucault, doctors

began to make house calls. This shift not only allowed them to observe the relationship between poverty and various illnesses, but it led to a change in where medical care was performed. As diseases moved out of the hospital, hospitals became research oriented, the state began to provide laws and funds for them and for a climate of research. These steps led to the birth of the research hospital, where just as inside the asylum, the poor became the guinea pigs. The practice was justified, states Foucault, because the rich subsidized their treatment, so that doctors could learn more about the relationship between human beings and the disease they carried without the rich being personally involved (Ibid., 66-69).

In the process, however, doctors further strengthened their own privileged positions. Examining the dead was legalized at the doctors' insistence; dissection of corpses allowed for the examination of dead tissues and for analysis of the disease from its corpse, so that there developed the new science of pathology. The invention of the stethoscope, for example, added hearing and touch to sight. Before then doctors only looked at fully dressed patients who sat across from them. As patients undressed, religious and moral dogma about sexuality began to change as well. Consequently, the stethoscope was found to bridge moral and technological obstacles for doctors. It differentiated them from ordinary mortals for whom the old rules still held (Ibid, 162-166).

The advance of medicine and the promotion of the doctor to the role of someone who has insight beyond common sense is clear. Every civilized area must have a technologically equipped hospital nearby. Hospitals are full of redundant expensive diagnostic machines. Every hospital must be able to handle every disease. Everyone

should feel great all the time. These are the myths of the science-driven, money-driven health care system of Western culture. Most relevant to this study is the observation that physicians, rather than relying on the words of the patient in diagnosis, instead attempt to convince the patient that the machine always knows best.

A look back at this example in medicine opens up a parallel view in military personnel management. Just as physicians first attempted to separate sick organism from its disease and no longer looked at the whole of interaction between the disease and the body, personnel managers have attempted to separate the humans needs into categories and separate all these categories from the human. This process is done by the identification of traits that would make a person "likely" to enlist or reenlist, and then these traits are identified as stand-alone issues rather than understanding the "holistic" nature of such life-changing decisions. This isolation of traits by the analyst then allows a rank ordering of such traits with the ultimate conclusion by the models that targeting some traits will suffice. Also, as Foucault points out that individual practitioners are merely doing their best with what they understand. Most, if not all military personnel managers, especially those working with predictive models, are only sub-specialists (and perhaps not even at that level) who apply best intentions instead of acute wisdom to these issues. Like the doctor who may hear what the patient says in the examining room (mostly out of politeness) and then ignore it, the final analysis is really decided mainly by what the diagnostic machine reports. In manpower, although routine surveys of sailors are being conducted, the results of these surveys seem rarely to change policy decisions. Human response appears to be no match for the scientific answers produced by currently used econometric models.

Personnel models have become the opiate of the over-tasked, under-trained military personnel manager. The idea that attrition and job change are a common part of modern society has been ignored. The military continues to hold on to a closed personnel system that seeks technological answers to do away with recruitment and retention failures. Instead of relying on surveys to gain information from its adherents so as to treat them as individuals, it relies on statistical answers gained from models to prescribe more doses of its traditional cash cure. Attrition is seen as unnatural. The Navy has sub-optimized its personnel system by relying on recruitment and retention techniques that keep whom it traditionally has needed. An improved approach would be first to determine whom it will need, and then design the proper system to recruit and retain those personnel.

On occasion a whole society was designed upon the premise that the government could properly direct the career choices of its people, either by a few simple academic tests or in an even less scientific manner of assigning citizens to work based simply on the need to fill positions in an occupation currently under-subscribed. This practice of a central government controlling production output is often referred to as a directed economy. The American political system is designed instead to be more of an open economy where people have a greater right to pursue happiness in their choice of occupation. While the Navy gives entry-level aptitude tests and such tests do provide insight into job fits, it should not expect this testing to be the only way to recognize individual differences. Accommodations must be made to allow people to develop, through education and training, skills necessary to be successful in career-fields that the individual wants, not just to fill career-fields experiencing shortages.

Social Institutions and Humans

Peter Berger, a noted sociologist in his book, The Sacred Canopy: Elements of a Sociological Theory of Religion, maintains that humans, unlike other animals, have no species-specific environment (1967, 23-25). Humans can inhabit, within limits, any number of geographical and climatic environments. Unlike other mammals humans still develop biologically outside their mother's womb for the first year of life. During this period of utter dependence, we interrelate with other humans and develop our basic dependence on our culture. Berger describes all mankind as a product of three movements; externalization, objectivation, and internalization. Because there is no biologically grounded structure of instincts, people create human structures to perform these functions. Cultural organizations are the desire of humans to externalize. Cultures identify themselves, once built, as something "out there." They obtain a reality that is experienced -- this is the process of objectivation. Internalization is the process where the "out there" is re-absorbed. In this way individuals not only comprehend culture, but they also identify with it.

Berger suggests that grounded in this biology is a necessity of externalization. Raising children in isolation has shown poor results. Individuals raised in such a setting were deprived of the ability to mature mentally or physically. Culture is constructed and reconstructed on a continuing basis. Humans who do not see this process occurring forget that the world they live in has been produced by themselves. Berger suggests that authenticity in one's life could only come by recognizing that man must relate out of chaos to his world and that the individual alone is responsible for his actions in this world. In the following remark, nomos means "a meaningful order" (Berger 1990, 19).

Seen in the perspective of society, every nomos is an area of meaning carved out of a vast mass of meaninglessness, a small clearing of lucidity in a formless, dark, always ominous jungle. Seen in the perspective of the individual, every nomos represents the bright "dayside" of life, tenuously held onto against the sinister shadows of the "night." In both perspectives, every nomos is an edifice erected in the face of potent and alien forces of chaos. (Berger 1990, 23-4)

The larger social order is possible only through collective participation in it. The dominant order of a society is provided by a coherent, over-arching organization that provides a meaningful world for individuals to live in. A personal sense of order hinges on an identification with the larger culture. The requirement is for the person to fit into society, not for society to change. In this sense technology requires the human to adapt to the needs of the machine. If technological advancements in the machine demand different characteristics of its human operator, then the cultural organization seeks humans with those skills. Thus, as technology has both improved and complicated weaponry, lower skilled laborers are seen as unable to meet the machine's needs. To operate effectively in the new millennium a personnel management system must choose one of the following alternatives: (1) provide necessary training and education to these lower skilled workers to meet these new high-tech needs, or (2) understand that high-tech workers replacing laborers will carry multiple differences into the workplace making old management practices obsolete.

A fundamentally important part of social order is the institution. Institutions not only regulate; they really control some parts of human activity. They control by punishing those who deviate. The institution need only initiate sanctions against the individual who does not "buy in" to the established pattern of thought. Institutions control, by action and by claims to be the legitimate authority on a subject. Sometimes they possess a degree of moral authority suggesting that conformity is morally right and

nonconformity morally wrong. In the mid-1980's Harold Leavitt wrote a book about the importance of visionaries to a growing, healthy corporation. He correctly identifies the challenges for a company that continually keeps most visionaries on the sidelines. He states: "The most powerful killer of creativity is social disapproval" (1987, 107).

Negative responses are used very effectively in all socialization processes from child-rearing to the promotion systems in the military. Punishment for every failure effectively eliminates creativity and vision, and punishment for telling the truth destroys the entire system. As a consequence, the Navy must manage information in an honest and responsible manner. In the 1970's and 1980's, Navy personnel managers had intimate knowledge of manpower models because they were part of their development. They understood, if not totally the mathematical aspects of the process, certainly the basic assumptions of the models. During the 1990's, manpower models became progressively less and less understood by the people who operated them. Therefore, the predictions these models enumerated were less and less challenged. The operators of the models, like the doctors previously described, felt bound to rely upon the results of the machine.

In a work co-authored by Peter Berger, The Homeless Mind: Modernization and Consciousness, the authors suggest that perhaps the key technology change of culture was the transformation of institutions into bureaucracies. This step caused alienation from the culture, which is so vital to the full development of the individual.

The individual is "surrounded" by bureaucracy far more effectively than he is by the technologized economy, at least as far as his social life is concerned. Therefore, while the discontents of bureaucracy are similar to those brought about by the technologized economy, the individual is more likely to suffer from the former than from the later....

Modern society's "solution" to these discontents has been, as we have seen, the creation of the private sphere as a distinctive and largely segregated sector of social life, along with the dichotomization of the individual's societal

involvements between the private and the public spheres. The private sphere has served as a kind of balancing mechanism providing meanings and meaningful activities to compensate for the discontents brought about by the large structures of modern society. In the private sphere, "repressed" irrational impulses are allowed to come to the fore. A specific private identity provides shelter for the threats of anonymity. The transparency of the private world make the opacity of the public one tolerable. A limited number of highly significant relationships, most of them chosen voluntarily by the individual, provide the emotional resources for coping with the multi-relational reality "outside." (Berger, Berger, and Kellner 1974, 183-6.)

In a Navy bureaucracy that demands uniformity in so many aspects of their life, individuals have deepened their ties to their non-bureaucratic lives. Thus, when considering reenlistment sailors, more and more choose satisfying the needs of their families over the needs of satisfying the bureaucracy. Bureaucratic personnel management systems not only allow, but actually encourage thinking that excludes looking at the individual case and stressing the general. The problem is compounded in the Navy bureaucracy because decisions tend to become totalitarian in nature if not constantly reviewed. Technology-based bureaucracies, such as the Navy's personnel management system, although in a democratic society, become totalitarian in the decision-making role.

Although the origins of these organizations are linked with scientific discovery, they also represent a merging of science and technology and changes in the accepted standards of professional behavior among scientists and engineers. Teamwork was essential, and so was secrecy. ...

One function of secrecy has been to reinforce linear, mission-oriented thinking by ensuring that ideas, innovations and doubts can only be expressed through the institution's own bureaucratic channels, and not in the press, Congress or Parliament. This protects the central goals of the institution from ambiguity or uncertainty by making sure that criticisms or divergent, perhaps irrelevant, inventions are compartmentalized by bureaucratic procedure. The same procedures also ensure that no individual carries unique responsibility, thus encouraging people to feel that it is not incumbent on them to raise questions. (Pacey 1989, 130.)

Of course, it is possible to raise doubts about the personnel management system, and such doubts are raised occasionally within the system. However, since currently serving manpower analysts often lack a full understanding of the models and their assumptions objections or reservations are less common than they should be. Moreover, many Navy personnel typically found in shore personnel management assignments, not having received detailed education in modeling, are likely to lack confidence enough to challenge existing models. Most importantly, since no replacement system is readily available, managers tend to view themselves as passing through assignments rather than uniquely responsible for any observed model shortcomings. Thus when the recommendations of the models conflict with survey results, the Navy manpower manager is most likely to see the model as superior, and survey results are usually ignored.

In the civilian sector, employee opinions are constantly sought. For example, a survey published in August 2001 noted practices that civilian corporation workers said led to their personal job satisfaction and those that would improve their retention at their current workplace. Table One lists responses about what leads to job dissatisfaction in the workplace. Table Two provides these same workers' opinions of how to change their work environment to improve their desire to stay with their current employer.

Of note is the rather low status of pay in importance (fourth on both lists), in these workers' opinion. In both cases, some basic improvements in recognizing the worker's value and in improving interpersonal relationships were esteemed more important. Having company leaders take these steps could improve the workers' job satisfaction and their desire to remain with their current employer. To most Navy personnel managers this list,

although taken in the civilian climate, would not be shocking. They have seen similar responses in military surveys in the past three decades.⁶

Table 1. "What causes the greatest dissatisfaction at work?"

Dissatisfaction Item	Percentage
Lack of appreciation	33%
Too much paperwork	27%
Problems with supervisors	23%
Poor pay and benefits	22%
Lack of training	20%
Lack of opportunity	20%
Lack of Fairness	18%
Problems with co-workers	16%
Commute	15%
Boring job	09%

Source: Gregory Smith, "Simple Rewards are Powerful Motivators" *HR Focus* 78 (Aug 2001) 10.

Note: Responses do not add to 100% as more than one answer was permitted.

Even though pay is not the leading factor in most surveys, over the last ten years in either the civilian or military environment, during this same period of time economic models and Navy personnel managers have largely suggested pay as the solution to nearly every recruiting or retention crisis. In the past, such as during the nation's move to an All-Volunteer Force in the early 1970's and in the early 1980's (when the military had been paying low salaries and had years with no increases), that pay *was* the major cause of low recruitment and retention. During this period the econometric models were

⁶ Executive Summary of DMDC Report No. 2000-008 of February 2001, page iii. "The 1999 Active Duty Surveys (ADS) continues a line of research begun in 1969 with a series of small-scale surveys administered approximately every two years. These surveys were expanded in 1978 to provide senior Department of Defense (DOD) officials with information about both members and spouses... DOD also conducted large-scale surveys of active-duty members and spouses in 1985... and 1992."

developed and validated. Over the last decade, however, sailors are reporting in their surveys a distinct interest in quality of life issues.

Table 2. "What do you think would be the most effective action the company could take to improve retention?"

Retention Improvement Recommendation	Percentage
Train managers better	32%
Listen more	28%
Try something new	24%
Pay more	23%
Select managers better	22%
Set the example	22%
Hire better people	18%
Improve benefits	13%

Source: Gregory Smith, "Simple Rewards are Powerful Motivators" *HR Focus* 78 (Aug 2001) 10.

Note: Responses do not add to 100% as more than one answer was permitted.

In 1999, the Government Accounting Office (GAO) administered a survey to approximately 1,000 Army, Navy, Air Force and Marine Corps personnel in what the services have identified as "retention critical specialties."⁷ Mainly, these are the high-tech personnel in demand today and expected to be the bulk of the force needed in the future. Results of this survey reveal that these respondents prefer better working conditions to more money. "Improving pay and benefits is an important concern for military personnel, but there seems to be a much greater need to address other quality of

⁷ These specialties include intelligence analysts, military police, computer programmers and operators, electronic technicians, avionics specialists, and pilots and navigators.

life issues in the retention of military personnel, including the nature of their work circumstances" (GAO 1999, 3-4).

The survey showed that military dissatisfaction came in the areas of frequent deployments, lack of equipment, understaffed work places, medical care for dependents, retirement pay, and family separation. GAO specifically reports:

The survey findings generally suggest that actions to address the retention of military personnel in retention critical specialties or to develop effective and reliable assessments of military quality of life, should place special attention on aspects of military servicemembers' work circumstances. (Ibid., 3)

Faced with such clear survey results, DOD's response to this survey was as follows: "DOD officials said the survey confirmed their view that no single factor determines an individual's decision on whether to stay in or leave service, but disagreed that work circumstances deserve special attention."⁸ In later chapters of this study, further surveys will be presented and econometric models will be examined to see if DOD and the Navy are justified in this position.

Values, Virtues and Moral Leadership

The world of culture imposes limitations upon what is otherwise possible. These limits can be as direct as the likelihood of reduced educational opportunity, for anyone born into poverty, or as obscure as an expected five-year reduced longevity of those born left-handed. Terry Eagleton in his book, Literary Theory: An Introduction, postulates that our culture so controls who we are that any literary, philosophical, or moral theory is only a warped reflection of what our culture has taught us (Eagleton 1993, 11-15). Certain kinds of positive human values are felt to be under pressure in a materialistic society. Yet

⁸ Government Executive Daily Briefing, September 28, 1999. "Key Military Personnel Aren't In For the Long Haul," by Katy Saldarini

core values cannot be discarded by the society since they are important to all cultures, and therein lies the significance of theory. Theory, philosophical or literary, is a means of pointing out what the culture is telling its clientele, so that clients may be assured that the culture's message is desired. Alasdair MacIntyre observes:

(T)he tradition of virtues is at variance with central features of the modern economic order and more especially its individualism, its acquisitiveness and its elevation of the values of the market to a central social place. (1984, 254)

In the Navy's case, over-emphasizing monetary rewards in its personnel actions sends the message that achieving materialism is of higher significance than fulfilling other values it proclaims as important. Deep in the human soul lie the fundamental values of human dignity and worth, which the institutions of family, church, nation, and employer have taught to us. We have been shown heroes in myths, folk-lore, and history as models of what we ought to be. The Navy places signs in the work place encouraging quality and ethics, e.g., Honor, Courage, Commitment. The sailor can accept a certain amount of disconnect between the values professed to the individual and the Navy's corporate-like actions, but should the divide become too large the basic spirit of the individual will respond, by demanding a change in the organization.

The Navy must be willing to allow visionaries in its leadership positions in personnel management. Leaders of reform in the personnel management system must be persons of high moral character who can be true pathfinders.

The pathfinders of the world also show at least three important and distinguishing attributes: they are men and women of *vision*; their *value* systems are clear, and strongly held; and they are *determined* to turn their visions into realities. Pathfinders are not to be confused with those promoters who will, for a buck, promote anything with enthusiasm...; nor with the wheeler-dealers, driven by acquisitiveness and the hope of the big windfall. Pathfinders hold some causes, some purposes, dear. While they are often introspective, they are also outward oriented. Like Maslow's self-actualizer, the pathfinder is less concerned with prestige or glory than with causing

movement toward some larger purpose. ... Hence the attributes of *vision* (of some future that is worth building), *values* (some moral boundaries on how things should and should not be done), and *determination* (willingness to take the risks and make the sacrifices that will move that vision forward.) (Leavitt 1987, 61-2)

Naval officers have traditionally been rewarded according to their operational tour performance. Operational organizations stress the importance of mission accomplishment, but they scarcely reward or punish commanders according to their understanding of personnel retention issues. Instead, retention is usually the responsibility of a junior person at the command, or, worse, it is assumed to be the responsibility of the larger bureaucratic organization. Consequently, little emphasis is placed on monitoring sailors at the command level. Further, no standard methodology exists for these operational commands to pass up to the manpower decision makers critical information, which would allow personnel planners to know sailors' actual needs. Operational commanders need to report systematically front-line sailors' desires to manpower policy makers and to feel a keen responsibility to the overall organization for their "deck-plate"⁹ impact on retention.

The independent American soldier and sailor of our forefathers is now the bureaucratic employee, dependent upon a Navy system that often takes little responsibility for the sailor's long-term security or benefit. Because of the technology orientation of today's Navy and the federal government's inclination to the Navy for social experimentation, the Navy no longer seems to have a clearly defined philosophy and often seems to operate outside the norms of the larger society it serves. In creating its own cultural setting, the Navy unwittingly projects the myth of success as achieved in

⁹ Deck-plate is a term in the Navy that means those people actually serving in operational units and carrying out policy made elsewhere. In the Army it is usually identified as "in the trenches".

material accumulation. Instead, it ought to stress the more substantial satisfaction found in fulfilling a human's moral needs.

Generally speaking, industry has not troubled enough about the greater or lesser importance of needs to be satisfied. It simply complied with public taste, and manufactured with no other thought than that of selling. ... Without disputing the services it (mechanization) has rendered to man by developing the means of satisfying real needs, we reproach it with having too strongly encouraged artificial ones, with having fostered luxury. (Bergson 1977, 306-7)

In any organization, there is pressure to be a team player when wanting to have any chance of influencing decisions. Many leaders will compromise their judgment in some areas, ignoring flaws or "lesser evils" of the organization, to concentrate attention on the bigger ones. A moral person may find most of his or her energies at work spent in killing bad ideas. In this kind of atmosphere it is soon easy to see things not as good or bad but rather in shades of gray. We need history to remind us that inside the largest of bureaucracies there are individuals who have the information and power to make ethical decisions.

The problem of the relation between civilizations and individuals...[is that] the institution which we call a society consists in the common ground between the respective fields of action of a number of individual souls; that the source of action is never the society itself but always an individual; that the action which is an act of creation is always performed by a soul which is in some sense a superhuman genius; that the genius expresses himself, like every living soul, through action upon his fellows; that in any society the creative personalities are always a small minority; and that the action of the genius upon souls of common clay operates occasionally through the perfect method of direct illumination but usually through the second-best expedient of a kind of social drill which enlists the faculty of mimesis (or imitation) in the souls of the uncreative rank and file and thereby enables them to perform "mechanically" an evolution which they could not have performed on their own initiative. (Toynbee 1987a, 533)

Is such spirit possible in the Navy? Yes, but only if leadership can be recognized as occurring both in and out of operational assignments. Jack Hawley in his 1993 work, Reawakening The Spirit In Work: The Power of Dharmic Management, describes

leadership as being spiritual. Hawley suggests individuals become leaders by listening to their spirit and believing in it. For him bureaucracies only get leadership by recognizing that they are made of individuals who fit into the whole but are not uniform in nature.

Technology's Demand for Quantification

Technopoly is a state of culture. It is also a state of mind. It consists in the deification of technology, ... finds its satisfaction in technology, and takes its orders from technology. ... Technopoly flourishes when the defenses against information break down.

The relationship between information and the mechanisms for its control is fairly simple to describe: Technology increases the available supply of information. As the supply is increased, control mechanisms are strained. Additional control mechanisms are needed to cope with new information. When additional control mechanisms are themselves technical, they in turn further increase the supply of information. When the supply of information is no longer controllable, a general breakdown in psychic tranquility and social purpose occurs.

It (technopoly) is what happens when a culture, overcome by information generated by technology, tries to employ technology itself as a means of providing clear direction and humane purpose. The effort is mostly doomed to failure. (Postman 1993, 71-72)

This failure by technology, as described above by Postman, is caused by the fact that unconstrained technology will remove human input entirely. Technology sees the scientific method as the proper means to find the truth. Knowledge can only be knowledge if it can be predicted and demonstrated by using the scientific technique. Technology demands quantitative answers to all questions. Therefore, in making personnel decisions, decision makers are more likely to pose questions like, "What model did you use?" rather than "What do sailors think about that?"

Leadership books stress that leaders motivate their people by inspiring them to do their day-to-day best. Conversely, Navy manpower management, which has ceased relying on its leaders to provide solutions has instead been quantifying personal traits to

remediate personnel shortages. Manpower analysts have psychoanalyzed people and divided them into categories to figure out what makes them tick. Leading organizational management books show how to classify people into parts and groups so that managers might help reduce tension in the work place and increase productivity. Sociologists have established traits by which to label people as: strong or weak, masculine or feminine, high-tech or labor intensive. In short, even for personnel studies, technology and scientific advance have developed hand-in-hand.

Reliance on such measuring devices by the military has not succeeded. In the Navy's personnel management system, for example, people tended to be identified as traits and individual characteristics, rather than as whole but individual humans. If individual traits are the key to leadership, then one could study successful Navy leaders and identify traits in those successful leaders and then use this information to identify who should be recruited. Such a practice could lead to this kind of false logic. "A study of recent Admirals showed that many of these successful leaders had a younger sister in their family. Consequently, only men and women with younger sisters will be allowed into the Naval Academy."

In both civilian and military organizations a different management technique must be followed, one that encourages professionalism. The Navy currently manages its personnel in a narrow utilitarian manner. Efforts are made to recruit and retain in the "most numbers" mode. The problem is that this short-sighted approach does not consider long-term effects. Repeating the same management action will most likely attract and retain over and over again the same type of person, with the same job skills. Therefore, relying mainly on one approach may not overcome the personnel shortfalls that occur

today in many critical technical areas, areas which are expected to become more crucial in the future. The better solution is to use the modeling technology to identify individual differences, and to reassert that humans, not formulas, are in control. This shift will require a thorough organizational adaptation to recognize both the new skill-sets required in the 21st century sailor and the revolutionary change that occurred in manpower management in the 1970's, when recruitment moved from conscription to an all-volunteer force.

Technology's Link to Direct Compensation

Technology accepts uncontrolled expansion as a reasonable goal. In a capitalistic and materialistic society the way to gain stature is through possessions and power. A person with a large power base is usually a person full of possessions. Facing such cultural pressure, Navy personnel managers can easily be lulled into believing that they must solve recruitment and retention problems by treating their supposed underlying cause -- pay disparities -- without taking the time to identify the more important reasons for dissatisfaction.

Manpower managers apparently hope to distract sailors from feeling low work and life satisfaction by providing immediate gratification through material possessions. In place of the genuine needs of happiness and spiritual joy, they have attempted to satisfy material wants. The creator of this false solution is commercial advertising. Advertising has developed into the major factor controlling what the modern consumer desires. Sailors realize that their compensation package is unlikely ever to lift them to the upper pay ranks of American society. In the face of this known inequality in wages, sailors, like the rest of society, are bombarded, in advertising, with the idea that they can achieve

parity with higher wage earners in certain areas of their life. Thus, an extravagant electron system of entertainment may be found in the household of junior enlisted sailor, who qualify for poverty-level assistance such as food stamps. The temporal nature of the secular world, especially consumer advertising, convinces them not to wait until tomorrow when they can finance, lease, or rent today. Yet these financial options are really designed to satisfy passing fancies, while payments and interest rates only add more debt weight to the struggling sailor. By its system of bonuses, the Navy often inadvertently contributes to this problem as junior sailors may be tempted to splurge bonus monies on short-term wants rather than fix longer-term financial needs. Although the Navy can not stop advertisers from targeting its people, it can recognize its part in playing into such practices. John Galbraith addresses this matter as follows:

The fact that wants can be synthesized by advertising, catalyzed by salesmanship, and shaped by the discreet manipulations of the persuaders shows that they are not very urgent. A man who is hungry need never be told of his need for food. If he is inspired by his appetite, his is immune to the influence of Messrs. Batten, Barton, Drustine & Osborn. The latter are effective only with those who are so far removed from physical want that they do not already know what they want. In this state alone men are open to persuasion. (Galbraith 1958, 128)

Subdividing work into increasingly basic elements, and replacing human labor by machines are goals of technology. By its heavy reliance on quantitative techniques, one could claim that the Navy is moving toward "unmanned everything". The stated goal of this human replacement is to raise the level of wellness for all. Instead, observation reveals an increasing gap between the haves and have-nots. Knowledge is no small part of this gap. Educators love to show the correlation of increased lifetime earnings and increased education, presently, the Navy rarely addresses the problem that many of its applicants do not meet its entry-level educational requirements. Little effort is made

through education to raise to an acceptable level the skills of certain rejected candidates who show potential. Although many recruiting posters suggest joining the Navy to obtain financial assistance for college, few opportunities are provided for education intended to retain key personnel already serving. In effect, the Navy attracts people interested in education through such advertisements and then shows them the door if they actually want to pursue a degree full time. The Navy of the 21st century must be a Navy that highly values education.

The Study

Has the Navy lost sight of its sailors' characteristics and needs? Do individuals in charge of the Navy's personnel management system -- themselves part of the body they manage -- not need to adapt management policies if fundamental changes occur in the nature of those serving? Interviews conducted as part of this investigation reveal that many managers do acknowledge recent shifts in personnel requirements. However, they find that the Navy's bureaucratic ethos thwarts any changing management action required to meet real needs. To achieve a full adjustment in business or military affairs, information must get into the organization, be incorporated by high-level managers, and then be implemented at the lower levels. This adaptation can only happen when high-ranking individuals inside the system comprehend this need to change. Consequently, every individual inside the Navy's personnel management system has to direct attention up the organizational ladder to the need for reexamining current recruitment and retention policies. Those modelers and analysts currently serving, of course, feel the pressure of being seen as team players. However, every bureaucracy, including the Navy, requires individual change agents at all levels who can really benefit the organization.

Clearly, a single individual cannot solve all the problems of our world. Nevertheless, we each can make changes within our own workplaces, communities, or families. Our responsibility is to develop creative ways of thinking and acting that make the best possible use of the many opportunities presented by the constant change and innovation of our present-day world. No one has responsibility for the entire organization; yet the more people who take responsibility for themselves and their immediate sphere of influence, the more the organization itself can change. (Russell and Evans 1992, 10)

This study has used a historic look at the relations between of technology and humanities, to reveal how a high demand for high-tech sailors evolved in the Navy over the last few decades. This process demonstrated that, although personnel needs were changing over time, Navy's (and their models) underlying assumptions about them were not. Modeling procedures used throughout this period, and presently still in use, are based primarily on manpower models developed during the 1970's. These early econometric models were constructed as the Navy was shifting to an All-Volunteer Force. The target population of the modelers during this time was the recruitment and retention of personnel in mostly labor intensive occupations. Although the characteristics of this group caused personnel managers to rely heavily on economic factors, this formula is now outmoded.

The Navy's resistance to changing its models and policies, for recruiting and retaining high-tech sailors would be appropriate if there were no significant differences in the needs of high-tech and low-tech personnel. Therefore, quantitative analysis was used to investigate the following question: "Do current high-tech sailors respond to the same determinates, in the same manner, as labor intensive workers?" If analysis had shown few-to-no differences in recruitment and retention preferences for high-tech and labor-intensive sailors, then it could be expected that the current economically based personnel management system would be effective in the future. However, this study's interpretative

analysis concludes that, when surveys are examined, significant differences do exist in the qualitative needs of these two groups. The new high-tech sailors are interested in a professional career and expect the Navy to provide the education necessary for them to remain proficient in their skill area. Details of the study's findings and recommendations for new practices to manage this emerging professional sailor properly are detailed in later chapters.

Chapter Two of this work provides a survey of literature in this field. It is useful to support the material presented in this study, and to serve as a baseline of material that should be consulted for any further research in this area. The chapter is divided into three areas of like material, designed to help the reader focus on particular issues of concern. The first area deals with the relationship between humans and technology. This interaction was a major focus area of course work in the Salve Regina University humanities Ph.D. program. Therefore, many of the readings in this section were regularly assigned in courses. The second grouping concerns the key ideas of other authors on the subjects of personnel management and labor economics. Although the Navy is a large organization without a profit motive, it is similar to corporations in many manpower management issues. Works cited here on management reveal a changing attitude in the work place. Past assumptions about worker qualities and needs are changing. Both management and workers now focus on fully recognizing each worker as a human with complex needs. The third and final segment of literature review deals with manpower modeling. This section details significant work done in the area of military modeling over the last few decades. Many of these works are technical reports of modelers and analysts that provide information on recurring manpower issues of this period.

Chapter Three provides an introduction to the Navy's personnel management system with the changes it has undergone over the last thirty years. The chapter starts by acknowledging how in the 1970s the U.S. Navy's leadership prepared for pending personnel shortages. These shortages would result from the end of conscription plus a nation-wide demographic projected shortfall of available male high school graduates aged 18-23 in the U.S. labor market. To lessen the effects of this imminent shortage of potential personnel, several Department of Defense (DOD) management initiatives were introduced. In the Navy, these included competitive wage increases, an increased emphasis on minority and female recruiting, and the gradual introduction of ship designs specifically designed to require fewer people. In sum, shipboard personnel were to be reduced by using technology to lessen repetitive labor intensive work.

A general decrease in military personnel followed the Vietnam conflict, and this reduction allowed detailed studies on economic policies to be conducted and models to be developed. During the early years of the 1980's, as a military build-up occurred, larger numbers began to accentuate personnel problems of recruiting and retention in the All-Volunteer Force. Despite the Navy's leadership's expectations, during this time the nation reemphasized that it would not return to the draft. As key positions remained unfilled, 1970's economic models began to come under scrutiny. In the Navy severe personnel shortages occurred in pilots, doctors, and submariners in the officer corps and for enlisted personnel in numerous high-tech occupations. Feeling the pressure of those shortfalls, Navy manpower leaders chose specialty and incentive pay as the solution, rather than redesigning the models. Although shortages were somewhat ameliorated by these cash

infusions, catastrophic shortfalls were mainly avoided because of the former Soviet Union's just-in-time dissolution in 1991.

With the greatly reduced threat of war and the desire of the American people for a peace-dividend in post-USSR thinking, Congress reversed the military build-up. The demand for ships and personnel to operate them shrank, allowing the Navy to meet minimum personnel manning requirements through most of the 1990's. Of great assistance to the Navy's effort to achieve its manpower goals during these last few decades was the nation's revised attitude toward minorities in general and to the idea of women serving in operational units. Today minorities are fully integrated into the Navy, and most occupations have become available to women. The critical demand on the Navy personnel management systems today comes from its operational commanders who are increasingly calling for more high-tech sailors.

The first part of Chapter Four, which deals with the current personnel management system seeks to explain the evolution of manpower models over the last thirty years. The chapter also examines differences in personnel identified as technical and non-technical. Technology changes have rapidly evolved in shipboard weapon systems. As these systems and their technologies progressed, the labor intensive work on ships was increasingly automated. This rapid technological growth occurred seemingly in a world separated from the personnel system. As technology evolved to lessen man-hour intensive work, automation expanded in ship activity demanding high-tech operators as the norm. For example, gas-turbines replaced boilers, manned gun mounts gave way to unmanned guided missile systems, and radio communications yielded to information

technology. Thus, as job skills required aboard ships became more technical, the operators and maintainers had to become high-tech persons.

This technological expansion is expected to continue. A Gearing class Navy Destroyer of the 1970's displacing some 3460 tons,¹⁰ contained well over three hundred sailors with about ten percent in high-tech rates. Today's Oliver Hazard Perry class ship displacing 3638 tons¹¹ has a crew of barely two-hundred sailors with about forty percent in technical ratings. A similar ship being planned for operation around 2020 timeframe is being designed to operate with a total crew of one hundred sailors, and will require approximately three-quarters of the crew to be of high-tech caliber. Simultaneously reducing total personnel serving on ships or at operational units, while sharply increasing the need for high-tech sailors is a challenge for future personnel planners.

In Chapter Five, a statistical examination is made of survey results to determine whether it is reasonable to conclude that the career desires and intentions of the future high-tech sailor will be the same as those of past labor intensive sailors. Standard statistical practices were used with emphasis on comparing means through regression analysis. By multiple regression techniques the relationship between a dependent or criterion variable and a set of independent or predictor variables can be analyzed. This dissertation used data derived as an inferential tool by which the relationships in the larger population are evaluated from the examination of sample data. Comparison of means was accomplished by the techniques of "Analysis of Variance" (ANOVA), and t-tests. In the t-test we expect that, if the two sample groups come from the same

¹⁰ As reported by the web site www.navsource.org USS Richard E. Kraus (DD-849) with a displacement of 3460 tons and a length of 390 feet had a crew of 336 personnel.

¹¹ As reported by the web site www.navsource.org USS Robert G. Bradley (FFG-49) with a displacement of 3638 tons and a length of 445 feet has a crew of 206 personnel.

population, then their mean would be roughly equal. Although a small difference by chance is possible, large differences would be rare. The means are then considered to be very similar. If the observed differences is large, we become more confident about differences in the groups. Data in this study were analyzed using the statistical package SPSS or "Statistical Package for the Social Sciences". This package is now owned by "Statistical Product and Service Solutions" a Chicago based software company.

Some accounts of Navy life today paint a bleak picture. Periods of declining Navy readiness and decreased retention raise several questions. Three of these key questions are the following: What is the level of satisfaction in the Navy ranks? Why are people leaving or staying in the Navy? How do Navy personnel perceive they are faring in today's economy? Other studies have examined the relationship between the intention to remain in the military and such variables as pay, health care, work hours, and job satisfaction. Past studies of the general population show linkage between these independent variables and dependent variables. These findings suggest that satisfaction strongly influences intent to stay in the military. On the whole, sailors say that pay and job enjoyment are among the main reasons for staying or leaving the military. Other common reasons include the quality of leadership and the amount of "personal/family time." Rarely are housing or health care for families cited as reasons for leaving.

The intent of this study was not to replicate other studies which asked the question, "How will sailors as a whole group respond ...?" Rather, the goal here was to analyze differences of wants between high-tech and low-tech sailors. For this purpose, comparisons were made to determine the differences between high-tech and labor intensive personnel. It was assumed for statistical purposes to test the null-hypothesis:

"There are no significant differences between these groups." If that negative assumption proved to be true the Navy could reasonably expect to be able to recruit and retain high-tech and labor-intensive skill workers with the same management policies and incentives. The results of statistical examinations are provided in Chapter Five.

Conclusions and Recommendations

Conclusions and recommendations are detailed in Chapter Five. This study used the survey data gathered in the, "1999 Survey of Active Duty Personnel" conducted by the Department of Defense. A comparison was made between high-tech skill personnel and personnel who do more labor intense work. As expected the results reflect that significant differences were present in the retention intentions and personal needs of these two groups in this survey.

Although high-tech personnel do not seem make their retention decisions solely on monetary factors, money and overall compensation are no doubt important to them. Currently, Navy personnel management policies appear to be doing an adequate job of satisfying labor-intensive skill personnel, because recruitment and retention of low-tech sailors exceeds requirements. However, a different approach seems to be necessary to satisfy high-tech personnel.

Evolving technology in naval ships equipment and ordinance is designed to reduce labor intensive personnel requirements onboard ships. In other words, technology has reordered the skills of the people required for naval service.¹² As these changes were occurring, the Navy was developing a personnel management system relying mainly on

¹² General detail sailors (Gendets) which need no formal schooling after bootcamp graduation have declined in percent of total sailors as follows: 1945 - 41%; 1957 - 28%; 1977 - 28%; (Binkin and Kyriakopoulos 1979, 19). This trend continues with these more current percentages of Gendets showing a further reduction, 1986 -18.7% and 1999 - 11.3% (Golfin and Blake 2000, 8).

economic models to manage labor intensive occupations. The result of these two factors is a significant disconnect between the economic based models and Navy's need to recruit and retain mainly high-tech sailors for 21st century weapon systems. Consequently, this new cohort of young men and women requires a fundamental change in the Navy's personnel management system. Technology places demands on humanity to adapt to evolving war-fighting and automation procedures. After responding to these demands, humanity will then place demands back on technology systems by demanding a personnel management system that accommodates the needs of high-tech sailors. This showing a relationship is symbiotic. In sum, the Navy's personnel management system must change to deal properly with the cultural change in sailors. This change occurred as an unintended consequence of technological changes in the equipment of the U.S. Navy as it moved toward and then into the 21st century.

CHAPTER TWO

REVIEW OF THE LITERATURE

The Humans and Technology Interface

The doctoral program in humanities at Salve Regina University encourages student reflection on the complex relationship between technology and the human condition. This study, as part of that degree experience, explores the interchange between two specific technologies and the individual sailor who will serve in the United States Navy in the 21st century. Although this dissertation concentrates on the management subset of sailors in the U.S. Navy, the lessons learned from this study can be extrapolated to other large organizations, both military and civilian.

The first technology considered in this study was the nature of equipment introduced into the Navy over the last few decades. These improved technologies and their increasing level of technical complexity have changed the required qualifications of sailors needed to serve in this high-tech environment. Improvements in traditional naval equipment have steadily reduced the need for manual labor on ships, while new war-fighting technologies, which have enhanced the ship's firepower, simultaneously increased technical skills needed by its operators and maintainers. This technology change from mainly labor intensive personnel to high-tech operators, has been encouraged by the Navy for several reasons, including lower cost and higher efficiency.

The percentage of high-tech personnel employed by the Navy will continue to grow as the United States seeks more and more to exploit its technological advantage in weapon systems. Such increased use of technology to replace human labor is common in most civilian corporations, especially those that lead in the field of high-tech development. As the 21st century progresses, the need for more high-tech personnel in the military will be matched by a similar need for more tech-savvy personnel in civilian corporations. Thus, the current competition for their job skills will most-likely continue.

The second technology issue examined in this study is the Navy's manpower management system, which, although it experienced many major external changes over the last thirty years, has chosen to respond to these pressures only in part. The most significant change, which must be considered as revolutionary in nature, was the nation's choice to move to a true, multi-racial and mixed-gender All-Volunteer Force (AVF). Previously, while subscribing to some half-hearted voluntary recruitment practices, the military relied on a male-only conscription when national crisis demanded increased personnel. Although this fundamental change to a voluntary military was implemented over three decades ago, the bureaucratic manpower management system operates as if it still relies upon conscription as a safety net.

Specifically, by believing that any catastrophic failure of the volunteer system would be repaired by returning to the draft which would fill critical shortages by true random-sampling conscription that would bring in required numbers in all skill areas including high-tech personnel. With such an antiquated personnel mindset, the Navy's manpower system has had problems meeting its true manpower needs. Even though it has managed to meet or almost meet basic goals for total numbers of personnel, this gross

overview of recruiting and retention hides the fact that today's Navy is not meeting many of its critical skill requirements. It recruits those willing to serve, over-recruiting and retaining labor intensive skills, instead of those it needs to meet some of its critical occupational requirements.

The tension between humans and technology is such that each one resists adaptations required to accommodate the needs of the other. This is not new. In the 1970's, national manpower research predicted that the services could expect a shortage of male recruits.¹³ National demographics and rising labor costs prompted the Navy to plan on for reducing manual labor needed on ships. The Navy's desire to reduce physical labor increased its need for more technology. Although the shift did require fewer sailors and less physical labor, its unintended result was a higher educational level of personnel needed on ships to operate and maintain more sophisticated equipment. In effect, technology responded to demands on it by putting its own demands on humans. This is an example of the tension between humans and technology.

The second technology considered in this study is the Navy manpower management system for dealing with the 21st century high-tech sailor, however, remains an unresolved struggle. The Navy's personnel management system and the humans it is designed to recruit, educate and retain are disconnected. At present, the technology system wants the high-tech person to enlist and serve, but it still employs techniques it previously designed to recruit and train a low skill, part-time laborer. This review of literature chapter, therefore, commences with a look at literature that specifically targets the area of interface between the human and technology.

¹³ Number of males reaching age 18 was expected to drop about 25 percent during the 1980's. (Levitin and Alderman 1977, 30-1.)

Humans and Technology Literature

Fritjof Capra in his work The Turning Point, describes his belief that the world is in the midst of many crises because it is trying to deal with today's issues with an outdated Cartesian-Newtonian view. The old view sees the human as mechanical and quantifiable in nature, but the new paradigm should recognize a more holistic approach. Although he does not directly address military manpower, the present Navy's manpower management policy's process appears to support Capra's overall analysis. Navy models have often attempted to reduce human behavior to quantifiable traits that could be manipulated by personnel policy practices, so as to bring about necessary increases or reductions in force size. Capra suggests that all science, including social sciences like manpower modeling and management, must accept what 20th century physicists have discovered, namely that models can never portray truth because they are only approximations of much more complex realities. In sum, we can gain some expectation of how people will react by using a model only if the model captures what people are considering. If not, we are merely monitoring different characteristics in the *model* rather than what motivates real humans in their decision process.

Social Darwinism in American Thought, a book written by Richard Hofstadter, is an account of how social science practitioners such as management "experts," sociologists, and economists were quick to adapt Darwin's evolutionary thoughts to their disciplines.

The popular catchwords of Darwinism, "struggle for existence" and "survival" of the fittest," when applied to the life of man in society, suggested that nature would provide that the best competitors in a competitive situation would win, and that this process would lead to continuing improvement. In itself this

was not a new idea, as economists could have pointed out, but it did give the force of a natural law to the idea of competitive struggle. [Further] ...the idea of development over aeons brought new force to another familiar idea in conservative political theory, the conception that all sound development must be slow and unhurried. (Hofstadter 1959, 6-7)

Concerning naval personnel, it may seem reasonable that management methods would work best on a "survival-of-the-fittest" system. After all, combat is the ultimate elimination process. But the current manpower management system has made careers in the service a means of unnecessary rivalry. By relying upon an "up or out" system the military does not promote all "qualified" people, but always only a subset. The Navy currently chooses to reward leadership traits over technical acumen. The Navy "up or out" system does not allow the option of retaining, until retirement, true technical experts who may not desire leadership positions. Promotion, which comes from rivalry or a kind of tournament removes from the system those not promoted. Some new thinkers are examining the weaknesses of this pyramid approach, however, and are proposing new kinds of careers that go against these Darwinistic traditions.

Jacques Ellul asserts boldly that technology has reached the status of being autonomous in today's society. Unlike other critiques of technology, Ellul does not see technology as a neutral force that can be controlled. Instead, he views technology as self-perpetuating through designed obsolescence, so that eventually there is no longer room for the non-technical. In his work, The Technological Society, he states:

The technical revolution meant the emergence of a state that was truly conscious of itself and was autonomous in relation to anything that did not serve its interests - a product of the French Revolution. It entailed the creation of a precise military technique (Frederick the Great and Napoleon) in the field of strategy and in the fields of organization, logistics, and recruitment; the beginning of economic technique with the physiocrats, and later the liberals. In administration and police power, it was the period of rationalized systems, unified hierarchies, card indices, and regular reports. (Ellul 1964, 43)

Ellul correctly identifies this revolution as the introduction of techniques that have taken on a life of their own. The bureaucratic and hierarchic natures of the Navy that have made them successful in many areas, at the same time have limited their effectiveness in human terms. The dominance of economics and its quantification of personal characteristics may have narrowed human choices in achieving job satisfaction. Certainly exclusive reliance on econometric models has given sailors the impression that the Navy's personnel management system expects them to see higher pay as a substitute for other job satisfaction characteristics which may be lacking.

Technology and scientific advance have developed hand in hand. As science sought to explore the universe, it required the technology of accurate measuring devices. Then, as it sought to explore human behavior, it demanded ways to measure human responses. So the formerly unbounded process of being human was constrained by the need of science to capture and categorize all behavior. For some, progress to some is the end that justifies almost any means. Scientists sometimes claim that they are only discovering things and not deciding how to implement them. Ellul further shows technology's growth pattern in this passage.

Self-augmentation can be formulated in two laws:

1. *In a given civilization, technical progress is irreversible.*
2. *Technical progress tends to act, not according to an arithmetic, but according to a geometric progression.*

The first of these laws -- and we base our conviction on the whole of history -- makes us certain that every invention calls forth other technical inventions in other domains. There is never any question of an arrest of the process, and even less of a backward movement. Arrest and retreat only occur when an entire society collapses. ...

The second law of self-augmentation explains a characteristic of the technical movement which has engaged the attention of contemporary sociologists. This is the unevenness of technical development. Enormous disparities exist not only in

the various global areas of technical expansion but also in each field within the various sectors. (Ibid., 89-91, emphasis in original)

This widely accepted "whole of history" view should suggest to the Navy that the use of technology, in the organization as a whole, will continue to expand. Faced with an increasing reliance on technology, the Navy must recruit and retain the best-fitted personnel, people who are capable of performing required operations and are also happy to be serving. As another thinker about technology explained:

Kant's doctrine, that every human being should be treated as an end, not as a means, was formulated precisely at the moment when mechanical industry had begun to treat the worker solely as a means - a means to cheaper mechanical production. Human beings were dealt with in the same spirit of brutality as the landscape: labor was a resource to be exploited, to be mined, to be exhausted, and finally to be discarded. Responsibility for the worker's life and health ended with the cash-payment for the day's labor. (Mumford 1963, 172)

In Technics and Civilization Mumford describes a capitalistic system that consistently downplays the importance of being human. Mumford, as did Marx, claims that laborers sell their skills to the highest bidder because other humans can always perform the same task, especially when jobs are labor intensive in nature. To counter this singular nature of human against the economic system, laborers often unionize. Similarly, other humans of highly skilled talent often form a professional group that then sets standards and is able to ensure quality in the profession. Although such professionals come under the pressure of the national economic system, their self-regulation of membership allows them to limit the numbers of "qualified" persons who are allowed to join, thus controlling supply and demand. If professional groups do not maintain higher economic standards than laborers, they will not attract enough new skilled entrants into the profession.

While professionals demand much higher than "minimum wage", they also have other non-pecuniary issues and incentives. High-tech sailors, for example, need to be recognized as professionals. Even simple recognition can greatly influence their retention patterns. It seems evident from questionnaire and interview findings, therefore that such high-tech sailors expect both appropriate remuneration and professional recognition. In short, the Navy's total pay expenditures can be less and individual sailors' personal satisfaction greater, if the Navy relied on a combination of pay and skill recognition as incentives for personnel recruitment and retention.

In The New Industrial State, John Kenneth Galbraith first defines technology and then goes on to show how specialization and information management are key factors of industrialization:

Technology means the systematic application of scientific or other organized knowledge to practical tasks. Its most important consequence, at least for the purposes of economics, is in forcing the division and subdivision of any such task into its component parts. Thus, and only thus, can organized knowledge be brought to bear on performance. ...

Technology requires specialized manpower. This will be evident. Organized knowledge can be brought to bear, not surprisingly, only by those who possess it. ... To foresee the future in all its dimensions and to design the appropriate action does not necessarily require high scientific qualification. It does require ability to organize and employ information or capacity to react intuitively to relevant experience. (Galbraith 1967, 11-14)

As the use of technology increases in the Navy, the resultant demand will necessarily be toward specialized manpower. At the same time, the sheer lowering of the numbers of persons on a ship will demand broader responsibilities for everyone aboard. The solution to this challenge may be an educated force with a stronger foundation in basic technical education at the associate degree or technical school level as a minimum. This force will also need "just-in-time technologies" to train personnel to operate and

repair a wide variety of technical equipment. Education will allow sailors to understand the theory behind the workings of various systems. Technical manuals and CD-ROMs will then be able to provide the detailed knowledge for daily operation and maintenance practices.

Time away from the technician's primary occupation must be reduced to a minimum. In the past, sailors were awarded breaks from their shipboard duties by being assigned to shore duty positions that were not necessarily in their job occupation. For a labor intensive skill worker, this change of routine could be of great benefit. For high-tech personnel, working in jobs outside their skill area is generally disastrous because technology's rapid rate of change would leave them less proficient in their technical area of expertise. For this reason, sailors of leaving sea-duty today are often unhappy with such "away-from-skill" shore assignments. When they are due to return to sea a few years later some choose to leave the Navy because they no longer feel competent in their field after an assignment unrelated to their technical specialty.

As noted in Chapter One, Peter Berger in The Sacred Canopy: Elements of a Sociological Theory of Religion maintains (1967, 23-25) that humans have no species-specific environment. Cultural organizations come from the desire of humans to externalize. Culture, especially in work organizations is constructed and reconstructed on a continuing basis. Humans who do not see this change occurring have forgotten that the world they live in has been produced by themselves. A personal sense of order hinges on identification with the larger culture. The basic requirement is for the person to fit into society, not for society to change.

Institutions control people not only by their actions, but also by claims to be the legitimate authority on a subject. Individual research or concerns of non-personnel managers are usually no match for a complex modeling system that has been place for decades. Because of these factors Navy manpower management system has resisted policy changes although many recent professional studies have concluded that some basic changes would improve the manpower management system. Although the Navy uses recognized experts to study personnel issues and the findings of such studies are often examined at the highest levels, these recommendations for new management approaches seem to have been largely ignored. Despite the evidence that its technological management system is not meeting the needs of its current work force, the Navy allows key recommended changes to be lost in bureaucratic resistance. And in effect, business continues as usual.

Thomas Kuhn studied and then provided a superb analysis of scientific revolutions across the ages. He shows a general pattern of change that seems to cut across all fields of science, including so-called human science. Kuhn argues that "normal science" presupposes a conceptual and instrumental framework accepted without question by those currently working in the field. When research comes along that poses a question to present practices, it puzzles the entire scientific community. True scientific advancement in this field, Kuhn contends, can only occur through a complete overthrow of previously accepted rules. This breakdown of the rules causes a temporary crisis that will not be solved in the established framework. Therefore, the whole community can only return to normal once it accepts this new conceptual structure. Its only other option is to reject the findings and try to remain in the status quo even though it knows change is

required. Kuhn describes how traditionalists try to ignore new suggestions, which may be the partial answer to why recent studies recommendations have not been implemented in the Navy:

Usually the opponents of a new paradigm can legitimately claim that even in the area of crisis it is little superior to its traditional rival. Of course, it handles some problems better, has disclosed some new regularities. But the older paradigm can presumably be articulated to meet these challenges as it has met others before. (Kuhn 1970, 156)

Personnel Management and Labor Economics Literature

The Division of Labor in Society by Emile Durkheim explored the area of how complex societies demand a division of labor. The more a society advances in complexity which in turn leads to job subdivisions based on expertise, the more individuals will seek individuality and specificity in their work. Conflict generally occurs among individuals if everyone tries to do the same thing, but individuals are more satisfied and society benefits as a whole if specialization is encouraged. Individuals are admired for their contribution to the whole and the whole actually becomes more solid by encouraging this diversity. As Navy operational units become more and more complex, common skills are less valued. As technology pervades the daily life of the sailor, new skills become more necessary, and fewer people with no specific education or training are needed. Ship systems have become so intertwined that each unit is an interdependent web of sailors and equipment systems.

As part of its Performance and Accountability Series, the General Accounting Office (GAO) examined the Department of Defense (DOD) and reported in January 2001, that one of the eight areas of greatest challenge to DOD would be, "Hiring, supporting, and retaining military and civilian personnel with the skills to meet mission

needs" (GAO 2001a, 8). This report noted that first-term attrition has reached all time highs for DOD enlistees. Pulling in recruits to fill out and even over-fill the bottom of the pyramid gives the Navy aggregate numbers of personnel. However, with over thirty-five percent of those coming into the service not making it through their initial enlistment, little progress is being made toward building a professional force for the future.

In testimony on March 9, 2000, before the U.S. Senate, David M. Walker, Comptroller General of the United States, reported that GAO had studied nine private sector organizations to observe their behavior in managing personnel. They found that personnel management techniques of corporations can be effective in the public sector, including the U.S. military. "A useful first step for many federal agency leaders would be to adopt a human capital focus -- to put the spotlight on their human capital approaches in light of their missions, visions for the future, core values, goals, and strategies, in an effort to see whether they are managing their most important assets to their fullest advantage" (GAO 2000c, 11).

Over the last fifty years, as technology developments have changed the role of the machine in production, so too have the roles of management and worker evolved. In the early 1960's, for instance, a new relationship between worker and management developed in American businesses. Successful managers could no longer rely upon positional authority as the sole reason for workers to adapt to new procedures in the workplace. Douglas McGregor and others became leaders in suggesting that a new relationship must be fully developed. The new corporate vision must be one that allowed the workers to see a larger picture of themselves in the corporation's overall operational plan.

The distinguishing feature of the Scanlon Plan is the ... formal method providing an opportunity for every member of the organization to contribute his

brains and ingenuity as well as his physical effort to the improvement of organizational effectiveness. This is the integrative principle in operation. It is the means by which rich opportunities are provided every member of the organization to satisfy his higher-level needs through efforts directed toward the objectives of the enterprise. (McGregor 1960, 113)

McGregor's idea, like any other single idea, is not the final word on manpower management. Since his report, however, human resources departments in American businesses have dramatically expanded in size and broadened in concept of operations. The function of a typical business personnel department after World War II concentrated on hiring hourly workers to do manual labor and manufacturing work. In Human Resource Planning, one of the McGraw Hill series on management, James W. Walker summarizes how personnel management has grown in complexity. Over the years, it began to rely upon forecasting models to answer many evolving requirements questions. In the 1960's, the need for high-tech people as specialists began to emerge. The 1970's saw affirmative action and numerous other government-imposed programs demanding equality in employment practices.

During this period the Navy began to find itself facing the same management demands and government policies as those in civilian corporations. The terms leadership and management were used interchangeably in business and military literature. Traditional Navy leadership practices, such as expecting subordinates to carry out orders without knowing why, were challenged by officers and crew alike. Although the Navy management system used the 1970's to bring its personnel system up to corporate standards, civilian management changes from the 1980's and 1990's have not yet been widely incorporated. For instance, education began to be recognized as a key long-term employee benefit in the 1980's, and civilian employers began to encourage education.

Walker describes the 1990's in the civilian world as a period spent in the reshaping of work environments and customs. In many organizations workers set independent work hours or even worked mostly at home. Individuals demanded more and more autonomy in their work choices, especially high-tech workers in large organizations.

Professionalism and career advancement are the driving forces of the early 21st century skilled worker. An organization must realize that its people desire clearly defined career paths, and if the organization does not provide realistic opportunities to reach professional goals in daily work, the organization will not retain high-quality personnel. All organizations, both military and civilian, will almost certainly face these same demands from high-tech personnel.

Under Secretary of Defense for Personnel and Readiness, Dr. David S. C. Chu, has been actively involved in military manpower research over the last thirty years. Recently he stated, "The history of military personnel management over the last three decades is instructive, both for the problems encountered and the solutions adopted, and how these contributed to the contemporary success of America's armed forces" (Chu 2000, 204). Acknowledging the huge risk taken by the nation in moving to an All-Volunteer Force (AVF) Dr. Chu asserted, and how, "The early years of the AVF were rocky indeed" (Ibid., 205).

Although Dr. Chu correctly characterizes the last quarter of the 20th century as a period of military personnel management success, he wisely cautions that, if the services are to meet their 21st century management needs, several issues still remain to be addressed. Two of his proposed management solutions, as ways of retaining the right personnel, include basing pay on military needs and improving quality of life issues.

These issues include putting housing money in the hands of sailors to let them choose how to spend it. The military does not need to be in the business of owning housing units. Chu also recommends that good enlisted personnel who pursue focused higher education plans should be rewarded with pay and promotions including much wider opportunities to become officers. In general, an innovative and responsive management system is required to deal with the dynamic nature of the world, including constantly changing threats against U.S. national interests and objectives.

Charles Handy delivers an insightful look at the relationship between workers and organizations that can be expected over the next few decades. Although his book, The Age of Unreason, is directed at large civilian organizations, its message for the need for new relationships in work is quite appropriate for the 21st century Navy and its high-tech sailors. In the following quotation if the term "high-tech sailor" were substituted for his word "executives," the Navy's current dilemma would be evident:

The new organization will seek to bind its core executives to itself for as long as it thinks it needs them. The new executives, however, will be less ready to be tied, particularly if they have some sort of qualification as a passport.... In fact as management becomes more professional, with more professional-type qualifications, the executives will begin to think of their careers as professional careers, as a sequence of jobs which may or may not be in the same organization. (Handy 1989, 158)

One of the problems facing the Navy's current manpower process is the very nature of its closed personnel system. By requiring personnel to enter only at the bottom of the pyramid and then work their way up, the Navy loses the opportunity for its people to interact fully with the job-hopping, organization-shifting practices that are widely accepted in corporate America. Currently, a sailor who after five to ten years in the Navy, sees a career opportunity outside the Navy cannot jump to it without losing credit for

years of service vice what would be a normal career move for a 21st century civilian professional. Navy policy would also seem to discourage any successful ex-sailor's try for re-entry to the service after several years in civilian life. Current manpower policies require ex-sailors to return at their old pay level or perhaps even a lower pay grade. This practice disregards the fact that many ex-sailors have achieved professional growth through increased experience, training and education in their field. It seems likely that only those with little success in the civilian work force would accept such an offer to return to the Navy.

If maintaining its closed personnel system is necessary then the Navy must provide ways to retain the professionally-oriented high-tech sailor. To achieve this, goal, proper incentives are needed to overcome the natural tendency of high-tech workers to want to move freely between organizations. By making sailors content to remain on active-duty, the Navy can avoid having to deal with "broken"¹⁴ or interrupted issues. Career progression in most professional fields is inextricably linked to education. Therefore, the Navy needs to include a wide range of opportunities that provide education for sailors in career-oriented high-tech fields. Although corporations with forward thinking human relations policies continually educate their professional workforce, the Navy currently undervalues the link between worker loyalty and job-provided education.

When education becomes an essential investment, whether as a passport to a core job or as a route to acquiring a salable skill on the outside, then to ration it is absurd. It is equally absurd to try to shove it all in at the beginning of life, or to think that it can all happen in classrooms, or to ration it later on to those who were cleverest at 18 years of age, or to think that brain skills are the only skills that matter, just because a precious minority need them. A new world of work requires upside-down thinking in education. (Ibid., 172)

¹⁴ Broken-service is a term used to define a career in which the sailor was on active duty, then left the service totally, and then rejoined the service.

Peter Senge, author of The Fifth Discipline: The Art and Practice of the Learning Organization, provides insight into the advantages of developing a smooth communicative relationship between management and workers. Similarly, the Navy must make a full commitment to a shared vision between the organization and the individual sailor. This concept requires a symbiotic relation where sailors clearly understand that they are important to the Navy and the Navy really understands the significance of their individual needs. Navy leaders must believe and state that people are their most valuable resource, and in general this is the articulated message of Navy Admirals today. Sailors also need to feel that the Navy is willing to recognize their individual uniqueness and to reward them for their service. Providing resources and time to pursue educational goals is paramount to this recognition and reward:

The bottom line with shared visions is that individuals must have their own visions before a shared vision can exist. If people have no real sense of what truly matters to them, the best they can ever do is follow someone else's vision. This is the fundamental distinction between commitment and compliance. What needs to be recognized is that this is exactly the state of affairs that traditional authoritarian organizations have always sought: compliance to the boss' goals. *Work*, in the sense of "doing one's work," then becomes *labor*, "a factor of production," along with plant and equipment and materials. To change this state of affairs ... learning organizations must be fully committed to the development of each individual's personal mastery - each individual's capacity to create their life the way they truly want. (Senge 1993, 132, emphasis in original)

The major steps in proper personnel management are to recruit the right personnel and then to retain them. Identification of the right person includes screening out those who, once enlisted, are incapable of absorbing the education and training required to do the job. Retention also is a matter of identifying and meeting the needs of those who can fulfill future job requirements. Convincing the right sailors that the Navy can provide a professional path for them to achieve career satisfaction has been a major task around

since the conception of the AVF. This challenge will, it seems, only continue to increase in difficulty as technology in warfare advances. The problem identified in this 1969 passage increases markedly each year:

Keeping an adequate number of people on active duty to replace those individuals leaving the Service has always been a matter of serious concern to the Armed Forces. ...

The pressure for retention is further increased by the introduction, at a steadily accelerating pace, of highly complex and sophisticated new equipment that requires skilled and experienced personnel to maintain and operate. To train and familiarize a recruit with the very technical tools of modern war takes far more time and money than to instruct him in the traditional military skills of shooting and marching.... Yet, even as the requirement for maintaining high retention rates has increased, the attractions of highly paid, less hazardous civilian positions constantly lure more and more technicians and other experienced professionals from both the enlisted and officer ranks. (Falk 1969, 74)

This survey of literature in the fields of labor economics and manpower management reveals clearly that the use of technology in the Navy will continue to increase. So technology requires inescapably that the Navy must recruit, train and retain people of increasing technical ability. This need has been widely recognized and discussed in books, articles, technical reports and briefings to flag officers over the past few decades. Unfortunately, little difference can be found between the messages of today's researchers to Navy leadership and those of a late 1950's report by the Defense Advisory Committee:

Technology change means a change of weapons in the combat units, change in the techniques required in weapons maintenance and use, and change in the level of skill and judgment of the user. The day has passed when a large portion of the military workforce performed relatively unskilled tasks and a major measure of their competence was based upon discipline and physical fitness only. Today, a large portion of the defense team must possess not only the discipline and physical and mental stamina formerly required but also a trained, experienced and disciplined skill in the use of complex equipment....

Man is still the primary element of defense. It is he who causes the newer, more complex, more potent weapon to respond promptly and deliver its full

potential with accuracy. Without the control of the skilled individual the weapon is only an inert, complicated and expensive device.

The time and effort required to impart the training and experience necessary to control with maximum effectiveness the more potent, more complex weapons of today have markedly increased. This is true notwithstanding the generally rising level of education of our national manpower. Obtaining a proper return for this increased training effort requires that the services of the trained and experienced individual be retained for a reasonable period of productive service.

Such retention is not being realized today to an acceptable, economic degree. It is least realized in the skills requiring the most lengthy and costly training. Today there is a tremendous outflow of effort to train a stream of transient personnel to a journeyman level of competence without a reasonable realization of skilled service in return. This is the heart of the enlisted retention problem.

The reasons for this failure are numerous but basically relate themselves to a comparison of the total emoluments of voluntary military service with those available to the same quality of manpower in the civilian economy. The quality and degree of retention of skilled manpower required by the Services cannot be secured by compulsion in a democratic society at peace. Service of the caliber required cannot realistically be expected to flow primarily from patriotic motivation, felt by the small segment of society involved. An acceptable degree of retention of quality manpower in peacetime military service can be secured in a free society only by according those concerned a reasonable measure of the prestige and benefits they could otherwise achieve in civil pursuits in the mainstream of the economy. (Defense Advisory Committee 1957, 43-44)

The Navy, as part of total Department of Defense reform, has done much to increase "benefits" of the sailor since this report, but its personnel management team has done far less to work on the "prestige" or non-pecuniary aspects of the sailor's professional needs. Lacking are tailored programs that recognize the true professional nature of 21st century naval service. Retired Vice Admiral Arthur K. Cebrowski offers these insights on the Navy's reluctance to embrace this new high-tech sailor with an appropriate personnel management system:

The services must both mainstream and merge those with technical skills and those with operational experience in these areas. These are the new operators.

Every new revolution in military affairs produces a new elite. The inherent cultural changes are the most difficult and protracted. We must start now. While we delay, our people, our most vital asset, are deciding that they want to compete on a different team. (Cebrowski and Garstka 1998, 35)

The management principles of Harold Leavitt's, Corporate Pathfinders, Willis Harman's Global Mind Change, and Jack Hawley's Reawakening the Spirit in Work point to a need for management systems that can incorporate more individualized programs that recognize and try to improve the spirit of the worker. Personal spirit is the place where values are found. The Navy cannot make the error of relying exclusively upon technology to win future wars. It must understand that technology will be most effective when used by properly educated and motivated people. Sailors must understand who they are as individuals and how they fit into the whole. Hawley presents several ideas that can change management systems into effective people-centric organizations.

Leadership is achieved by listening to your spirit and believing in it:

The key to inner listening is (again) *believing* in it. Whether inner truth surfaces depends on whether you believe it will, and whether you believe that what you hear will be useful and true - and whether you welcome it. How often you receive inner signals is also related to how much you believe in them. The more you believe, the more reception capacity you have. (Hawley 1993, 153, emphasis in original)

Gregory Smith reports, "Sometimes, it's the small motivators that make a big difference. Coworkers' applause, a certificate thanking someone for a job well done, or just asking employees for ideas can pay huge dividends" (Smith 2001, 10). As David Friedman points out in, Corps Business, the same kinds of management action work well also in the military:

It's no secret that positive reinforcement of the financial ilk can bring out tremendous performances in many people. ...

But consider some of the drawbacks. People can wake up one day and realize that a big payoff isn't worth the misery of working hard day in and day out at a job they may not care much about, and for bosses they may not particularly respect. ...

Contrary to public perception, Marine officers also vastly prefer using the carrot to the stick. But they believe that the kind of positive reinforcement that

works best isn't the tangible kind handed out by business, but rather the kind that can only come from returning to subordinates some of the admiration that you hope to earn from them. (Friedman 2000, 127-8)

Extrapolating this concept to a more global approach, the Navy needs to show in its broad management policies that it too "admires" and values its people. To do so, it must be willing to provide professional programs, such as education and quality of life improvements, that recognize this new cadre of high-tech sailors as its most precious asset.

In bureaucratic systems such as the Navy, there is a natural tendency for power to accumulate in certain areas of the organization. Those who have political or economic power are in a good position to gain still more power and those with less power tend to be in a progressively poorer position. Within the organizations, however, some institutionalized mechanisms can be found for reversing this tendency. Until now, the existing manpower system has created a mystique that has separated it from much outside influence. Even those in Navy positions higher than personnel managers seem to avoid any challenge to its policy and practices. The existing system will most likely find the future even more challenging as it tries to recruit and retain the right persons since the extent of technology will increase in the military and civilian workplaces. In times of financial growth, which economic experts suggest will return, high-tech sailors could leave in droves. They will be enticed to move their careers to organizations willing to provide more professional-type incentives than those that current Navy manpower policies offer.

For the last few decades, numerous organizations have helped defense manpower planners with their work. Professional researchers have provided to the military in general, and often specifically to the Navy, solid research to diagnose recruitment and retention issues. This section of the literature review chapter is organized first to identify organizations that have provided key findings to the military and second to summarize those aspects of reports that directly apply to this study.

The first organization examined is Defense Manpower Data Center (DMDC) established in 1974 as the Manpower Research and Data Analysis Center (MARDAC) it was originally assigned to the Secretary of the Navy. Renamed to DMDC and placed under the Secretary of Defense. DMDC's mission is to collect and maintain Department of Defense databases in the areas of manpower, personnel, training, and finance. Beyond maintaining existing databases, DMDC also conducts personnel surveys such as the one discussed later in Chapter Five. Besides being a data warehouse, DMDC reports how it adds value to the raw data it gathers:

We add value by ensuring that data received from different sources are consistent, accurate, and appropriate when used to respond to inquiries. We maintain and use historical data to lend perspective to the study of current issues. We have great expertise in handling very large data files and in combining files (for example, personnel, pay, and training files) to develop new perspectives and insights into issues affecting the Department.¹⁵

DOD's 1999 survey produced two public releases of data by DMDC: a compact disk (CD) of active duty personnel and another CD of spouses' responses. Although the public release file is useful for some research, DMDC restricts the full "confidential" file. On its public release file, DMDC recodes or modifies responses to protect the confidentiality of individual respondents. Although confidential files contain very

¹⁵ DMDC Home Web site. "DMDC History and Mission." Go to: <https://www.dmdc.osd.mil/pprofile/owa/intro.forward> last accessed by author November 2002.

specific data on occupations and pay grades for a more precise statistical examination, even military research institutions such as the Naval Postgraduate School in Monterey, CA have been unable to gain access to the confidential file. So, this study relied upon the public release version.

The United States General Accounting Office (GAO) website describes its basic mission as follows:

The General Accounting Office is the audit, evaluation and investigative arm of Congress. GAO exists to support the Congress in meeting its Constitutional responsibilities and to help improve the performance and ensure the accountability of the federal government for the American people. GAO examines the use of public funds, evaluates federal programs and activities, and provides analyses, options, recommendations, and other assistance to help the Congress make effective oversight, policy, and funding decisions. In this context, GAO works to continuously improve the economy, efficiency, and effectiveness of the federal government through financial audits, program reviews and evaluations, analyses, legal opinions, investigations, and other services. GAO's activities are designed to ensure the executive branch's accountability to the Congress under the Constitution and the government's accountability to the American people. GAO is dedicated to good government through its commitment to the core values of accountability, integrity, and reliability.¹⁶

GAO has issued a number of reports in response to Congress on the results of the "1999 Survey of Active Duty Personnel." GAO has consistently reported that, although the military is generally meeting retention goals in the aggregate, it may be masking its needs in specific areas. In its December 2001 report, "Military Personnel: First Term Personnel Less Satisfied With Military Life Than Those in Mid-Career", GAO links low first term retention to the disconnect caused by promising education as a recruiting tool and then making people leave the service to achieve education:

Retention intent is related to the reasons that first-term and mid-career personnel joined the military. Among the top reasons that first-term enlisted personnel cited for joining were education benefits (43 percent) and training for civilian employment (18

¹⁶ GAO Home Website. "Introduction on Homepage of Main Website." Go to: <http://www.gao.gov/main.html> last accessed by author November 2002.

percent). Those who cited these reasons indicated that they were less likely to stay on active duty than those who entered for other reasons, such as personal growth or travel and experiences. This is understandable because personnel often leave active duty to use their education benefits. (GAO 2001d, 2)

When GAO conducted its own 1999 survey of military personnel, it concentrated on service members in "Retention Critical Specialties." Of sailors surveyed by GAO, 75 percent reported their intentions to leave, 15 percent intended to remain and 10 percent were undecided (GAO 1999, 14). Additionally, 59 percent reported "dissatisfaction with the military" (Ibid., 16). The following tables, compiled from this GAO survey, are intended to show the factors that these 1999 respondents cited as causes of dissatisfaction and wish to leave the military at the end of their current term of obligation. Table 3 captures responses of enlisted personnel surveyed by GAO while Table 4 shows the responses of the surveyed officers.

Table 3. "Rank Order of Quality of Life Factors Surveyed Enlisted in Retention Critical Specialties Were Dissatisfied With"

Enlisted
1. Retirement pay
2. Availability of needed equipment, parts, & material
3. Level of unit Manning
4. Base pay
5. Frequency of deployments
6. Reenlistment bonus program
7. Morale in unit
8. Ability to spend time with family and friends
9. Medical care for military dependents
10. Nature of deployments

Source: General Accounting Office (GAO), Report to Congressional Requesters, *Military Personnel: Perspectives of Surveyed Service Members in Retention Critical Specialties* (Washington, D.C.: GAO/NSIAD-99-197BR, August 1999), 20.

Note: Enlisted personnel, n = 739

Table 4. "Rank Order of Quality of Life Factors Surveyed Officers in Retention Critical Occupations Were Dissatisfied With"

Officers
1. Availability of needed equipment, parts & materials
2. Medical care for military dependents
3. Level of unit Manning
4. Retirement pay
5. Access to medical and dental care (in retirement)
6. Frequency of deployments
7. Civilian military leaders
8. Ability to spend time with family and friends
9. Amount of personal time I have

Source: General Accounting Office (GAO), Report to Congressional Requesters, *Military Personnel: Perspectives of Surveyed Service Members in Retention Critical Specialties* (Washington, D.C.: GAO/NSIAD-99-197BR, August 1999), 20.

Note: Officers, n = 210

What is of interest in this study is that for both enlisted and officer responses, "base pay" does not top the list. Instead, most of the items of dissatisfaction deal with issues that personnel management system could predominately address with non-pecuniary solutions.

A 2001 report by GAO examined the same DMDC 1999 survey used in this study. Entitled, "Military Personnel: Perceptions of Retention Critical Personnel are Similar to Those of Other Enlisted Personnel," this GAO report at first seems to stand in opposition to the findings of this study. But to do any comparison, it is important first to identify differences in the two studies' approaches. The first major difference is strictly in

who was compared. Some marked difference can be found first in what GAO calls "critical personnel"¹⁷ and the occupations generally referred to in this study as high-tech. GAO lumped the 64 occupations reported by all Services as "critical personnel" into 16 occupational groups and then consolidated them even more into three occupational areas. Unless the services make major organizational changes to become so joint¹⁸ that personnel can flow freely between the Services during their careers, this combining of occupations across the services is of little use to Navy planners.

A second major difference in the GAO study and this report is in the research methodology used to draw conclusions. GAO took selected responses of personnel in one group and compared them to all survey respondents. GAO then declared "a significant and meaningful difference to exist between the responses of retention-critical personnel and other enlisted personnel if their responses differed by \pm 7 percentage points" (GAO 2001b, 7). The findings of this study differ in two manners. First, it examined only Navy personnel, and, second, responses between the groups defined as "technical" and "non-technical" were compared. Conversely, the GAO study which compared a subset of the whole to the whole. The GAO focused on retention-critical occupations, which are a subset of high-tech personnel. Because those high-tech personnel not in retention-critical occupations were left in the GAO "all" group, it masked the differences between high-tech and non-high-tech personnel. Also, GAO used a non-statistical procedure to compare differences in its study by choosing to look only at percentages of people who

¹⁷ In the Navy, "critical personnel" are a subset of total high-tech jobs, a listing of Navy retention-critical occupations, provided to GAO for their 2001 study, is found in this study's Table 10 of Chapter Four.

¹⁸ Joint is a term that is used to imply seamless interaction between the military services. A "joint" operation is one where various units of the Services work together on an operation. Some schools are currently "joint" in nature but the individual services still control the assignment process of only their own personnel.

responded to the questions and then by setting an arbitrary seven percent difference as the "significance" level. In contrast to the GAO study, this study of Navy personnel responses used widely accepted standard statistical procedures, which are discussed fully in Chapter Five.

As for determining personnel requirements, Naval Sea Systems Command (NAVSEASYSCOM) and Naval Air Systems Command (NAVAIRSYSCOM) determine manpower requirements for every new ship or aircraft.¹⁹ Although this report does not deal in-depth with the requirements determination part of the Navy's manpower management system, some mention of its functions is necessary. Navy Manpower Analysis Center (NAVMAC) develops and maintains of all Navy manpower requirements processes. Its task includes performing manpower studies and providing technical consulting services in all facets of manpower management. In their own words here are there functions:

Using proven Industrial Engineering methods, we determine the composition of the positions (bils) needed to ensure that our ships, squadrons, and submarines can successfully fight and win our nation's wars. Our Occupational Standards provide the common thread that links Navy work with Navy Sailors. This thread sends the clear signal that defines all Navy positions with fidelity. It also sends the signal needed to train our sailors and to evaluate them through Navy-wide exams. . .

We continue to look for new/innovative ways to provide manpower analysis to meet and exceed the needs of tomorrow's Navy. Our involvement in the Navy's acquisition program is vital as we shape the workforce necessary to man and operate future systems and platforms like DD(X), CVN(X), and the Joint Strike Fighter.²⁰

¹⁹ HARDMAN is an acronym that comes from a process entitled, "Hardware Integration / Military Manpower System". The idea was to demand that proposals for any new equipment would at least consider the manpower requirements it would place on the personnel system.

²⁰ NAVMAC Home Web site. "Introduction on Homepage of Main Website." Go to: <http://www.navmac.navy.mil/> last accessed by author February 2003.

NAVMAC is concerned mainly with the billets or "jobs".²¹ They manage manpower authorizations by using the OPNAV Instruction 1000.16 series.²² As the manpower accountants OPNAV tracks changes and requests for changes from resource sponsors, claimants or the actual activities. If the request meets established criteria, then some kind of compensation must be enacted. In other words, to get a new billet, a prior job must be given up or a justification for the change be approved. OPNAV's role is to define the job, not to obtain or retain the right person for the job. Nevertheless, this determination process develops this rising demand for technical personnel. Unfortunately, the OPNAV personnel determining requirements work in partial isolation from other personnel managers, namely, the personnel policy makers and those responsible for recruitment and retention. The rationale for this separation is to develop billets for what is needed and not what is available. This separation leads, however, to more technical personnel needed, without input from the personnel policy makers who later must try to meet these requirements.

At the highest levels of the Navy organization exists the Office of Naval Research (ONR), which sponsors science and technology in support of the U.S. Navy and Marine Corps. Founded in 1946, ONR works with more than 450 universities, laboratories, and other organizations. ONR's website describes its research areas as:

From oceanography, advanced materials, sensors, and robotics to biomedical science and technology; from electronics, surveillance, and neurotechnology to manufacturing technology and information science; from advanced combat systems to other technologies for ships, submarines, aircraft, and ground vehicles — work ONR sponsored has produced the laser, the Global

²¹ A billet is a job in the Navy. It has specific occupational requirements including a pay grade, and prerequisite education and training completion.

²² As of the date of this study the latest edition was OPNAV INSTRUCTION 1000.16J of 6 January 1998.

Positioning System, 50 Nobel prizes, and thousands of other discoveries and products used every day around the world.²³

Today, human research factors at ONR concentrates on medical science, human performance, biotechnology, training and human factors, neural information processing, and biorobotics. For most human studies ONR seeks ways to adapt new technology to the needs of the human operator. In 1971, for instance, toward the end of the Vietnam conflict, ONR began studies in anticipation of the All-Volunteer Force. Although this area has received some ongoing funding it has been in decline since the late 1980's. Today ONR supports other organizations research in manpower, personnel and training. For example, the Navy Personnel Research, Studies, & Technology (NPRST) Department, receives funds under ONR's "Capable Manpower" program. ONR's current five year plan, has sixteen manpower projects. FY 2004-2007²⁴ projects include "Enlisted Manpower and Personnel Integrated Planning System," "Attrition Reduction Technology," "Culture and Values Selection," "Integrated Whole Person Assessment System," and the "Personnel Cost/Quality Tradeoff Model." In fact, the number of personnel issues being studied by ONR is expected to remain a low priority for funding at least through the first decade of the 21st century.

NPRST was formed in 1999 by a consolidation of several research organizations, as recommended in the Department of Defense Base Closure and Realignment Report of March 1995.²⁵ The most important of the activities selected for this consolidation was

²³ ONR Home Website. "Introduction on Homepage of Main Website." Go to: <http://www.onr.navy.mil/default.htm> last accessed by author November 2002.

²⁴ FY stands for fiscal year. A fiscal year is the budget year and may differ from a calendar year. In the Department of Defense a fiscal year is the time between 1st of October of a year until the 30th of September of the following year. FY04 would be the period between October 1, 2003 and September 30, 2004.

²⁵ The Secretary of Defense transmitted his recommended closures and realignments to the 1995 Defense Base Closure and Realignment Commission and to the Congress on February 28, 1995. The

the Navy Personnel Research and Development Center (NPRDC). From its establishment in May 1973 until its closing in September 1999, NPRDC was the principal research facility for Navy manpower studies. Its Manpower and Personnel Laboratory, which examined issues of quality and quantity, tried to advise the Navy how to determine and obtain of what its most effective mix of personnel. NPRDC itself had been an earlier combination of other commands, namely the Naval Personnel Research Laboratory and the Personnel Research Division of the Bureau of Naval Personnel. About NPRDC we learn:

NPRDC is an applied research center, contributing to the personnel readiness of the Navy and Marine Corps. The Center develops better ways to attract qualified people to the naval services, to select the best, to assign them where they are most needed, to train each one effectively and efficiently, and to manage our personnel resources optimally. By combining a deep understanding of operational requirements with first-rate scientific and technical abilities, the Center is unique in being able to develop new, useful knowledge and to refine technology to address people-related issues. This dual expertise permits the Center to develop the technology base for improving the use of human resources within Navy systems and to apply state-of-the-art technology to solve emerging problems. (Sorenson 1991, 7)

Although NPRST does some research directly sponsored by ONR, it works directly for the Commander, Navy Personnel Command, and is associated with a number of academic institutions that help in its research of personnel issues. NPRST, which has over fifty military and civilian personnel engaged in research, and reports their mission as follows:

We are the Navy's manpower and personnel research laboratory. We lead revolutionary change in the way the Navy recruits, screens, assigns, manages, cares for and retains its people. Employing a unique blend of innovative scientific and functional expertise, we investigate, develop and validate new technologies,

methods and business processes to improve the readiness, performance, and quality of life of Sailors and Marines.²⁶

NPRST's current vision for future manpower and personnel research and development is outlined in a web-accessible technical paper entitled: "Sailor 21: A Research Vision to Attract, Retain, and Utilize the 21st Century Sailor" (Navy Personnel Research, Studies, & Technology 2002, www). This vision paper recognizes that, while manpower research conducted in the 1970's and 1980's was a most important start, the technology of today has changed the Navy's needs so that current models fall short of these 21st century sailor's needs. "Sailor 21" differs from this dissertation by continuing to rely on economic modeling where pay is the preferred solution to current and future recruitment and retention shortfalls. Here is a "Sailor 21" excerpt that immediately points to pay as the solution to a future "red alert" pilot shortfall:

23 October 2008, 1900 hours: The Navy's officer strength planner has a congressional "tasker" for information on trends in the proportion of married officers over the last ten years, for each officer designator. She accesses the Data Warehouse and easily selects the exact information she is looking for, pastes it into an email, and sends it off, thinking that in the "old days" it would have taken several days to get the information by submitting a data processing request, and then the data would not be exactly right. Forward thinking programs such as IT-21 have also benefited personnel planners allowing them, like warfighters, to use and exploit information in more efficient ways. Then a red light begins flashing on her display screen. She clicks the "Alert" icon, and the program informs her that aviator resignations have exceeded expectations for the second month in a row. She clicks on the "Analysis" icon, and views easily digestible graphs showing historical aviator retention trends, a projected aviator shortage in twelve months if the recent behavior continues, and the likely effect on fleet readiness. The Analysis display also points out that airline salaries and hiring have significantly increased in the last three months. She clicks on the "Options" icon, and the intelligent system recommends a specific combination of accession and retention bonuses to address the problem. She browses the extensive supporting information provided by the system and uses it to assemble a briefing to justify

26 NPRST Home Website. "Navy Personnel Research, Studies, & Technology." Go to: <http://www.nprst.navy.mil/> last accessed by author November 2002.

her request to fund this option and avoid the aviator shortfall. (NPRST 2002, www)²⁷

After reading this paragraph one could surely question the need of any Navy officer serving as a strength planner, since a Congressional staff person could do this job part time just by clicking through the same paths. No real expertise in manpower would be required to rely completely on "canned" manpower models and their suggestions. In those positions that really would require a Navy person, "Sailor 21" does recognize technology's impact on future naval warfare and the resulting need for changes in the sailors to be recruited. Although the following quotation is lengthy it seems justified because it discloses Navy manpower management's current approach to future recruiting and retention issues:

The new Sailor will have to be process-oriented and less task-oriented. Where in the past, a Sailor might take and relay telemetry readings, he will now take the telemetry readings, verify them against targeting information, determine whether the projectile is ready by checking with other fire-control team members, and release it. This shift away from isolated task performance will by implication, alter the content and scope of the jobs defined by current classification models....

At the very least, each Sailor will be required to perform a broader range of tasks, have more sophisticated technological knowledge and skills, and will operate more independently with fewer coworkers, and in a flatter command structure. Jobs will become more complex, require more mathematical and electronic knowledge, have very broad scopes, and demand greater flexibility. This implies that current jobs will have to be redefined in light of the new requirements,

Because the cost of finding and training a 21st Century Sailor will be much higher than today, we will also have to focus more of our effort to identify individuals who will not only complete training, but be successful on the job, and, importantly, be likely to stay in the Navy beyond the initial contract. The prediction of such long-term behavior as reenlistment and promotion rates will require the use of new sets of predictor variables such as measures of personality, motivation, and interest. To effectively use the variables to predict long-term performance, we will have to gain a better understanding of the work context for the future Navy, including the environmental, social, and group structural characteristics. Combining the personal and organizational characteristics may

²⁷ Exact web subsection of this report is: <http://www.nprst.navy.mil/S21/PP1.htm> last accessed by author November 2002.

allow us to augment personnel selection models based on theories of person-organization (P-O) fit, which go beyond the usual vocational and aptitude relations. Our most difficult challenge will not be to identify measures of personality, motivation, and interest that predict long-term behavior, but to develop objective instruments for measuring these constructs that are insulated from faking, coaching, and easy misrepresentation. (NPRST 2002, www)²⁸

This study agrees with "Sailor 21" that "to effectively use the variables to predict long-term performance, we will have to gain a better understanding of the work context for the future Navy, including the environmental, social, and group structural characteristics." The solution, according to "Sailor 21," is to identify recruit characteristics in a different manner than presently used and then recruit sailors with these identified characteristics. Once recruited, the Navy will use mainly compensation as the means to retain this new sailor. This solution seems short-sighted. As Chapter Five of this study will demonstrate the successful 20th century sailor differs from the 21st century sailor as unskilled laborers differ from high-tech professionals. Thus, recruitment and retention policies will need to be modified to identify quality of life issues beyond pay that can influence this new cadre of sailors.

The Center for Naval Analyses Corporation (CNAC) is a federally-funded research and development activity. Originally started in 1942 as the Center for Naval Analyses (CNA), it started doing work for the Navy and Marine Corps on wartime operational problems. In 1964 CNA completed its first manpower study, "Manning the Future Navy."²⁹ Although it provided an in-depth look at conditions in the early 1960's, its data are now largely obsolete. CNA was especially active during the 1970's and 1980's

²⁸ Exact web subsection of this report is: <http://www.nprst.navy.mil/S21/S4.htm> last accessed by author November 2002.

²⁹ This document was not consulted by the author and is not cited in the bibliography. A partial citation is: H. Kenneth Gayer et al., Center for Naval Analyses, INS Study 11, "Manning the Future Navy", October 1964.

as a major source of quantitative analysis for the Navy and Marine Corps in policy analyses issues dealing with manpower. Today CNAC has two major divisions: The Institute for Public Research, which analyzes non-national security issues; and the Center for Naval Analyses, which concentrates on three areas: 1) personnel; 2) cost benefit analysis of technical equipment purchases; and 3) research in housing, medical care, and logistic support. In manpower, CNA reports that, for the last ten years its research has been the following:

Getting, training, and keeping the right people are important issues for any organization. For years, we have helped the Navy and Marines develop better approaches to recruiting. That work has spanned everything from ensuring that the testing procedures the services use are screening the correct skill levels to looking at better ways to tap the growing pool of community college graduates. In training, we are looking at ways to relate on-the-job performance to the quality and completeness of training programs. We are also helping the Navy and Marines improve the management of their workforce through better use of information on disciplinary rates and personal behavior.³⁰

From 1964 until 1987, CNA produced over 400 formal documents related to manpower, personnel and training. At its current website it lists only four recent projects in manpower issues, specifically: 1) enlistment bonuses (which found that recruits with signing bonuses have lower attrition rates than those without); 2) bootcamp attrition (which found that smokers have double the bootcamp attrition of non-smokers and recommended providing nicotine patches); 3) training partnerships (which suggests that the Navy become involved in Tech Prep³¹ program); and 4) ship readiness based on numbers of experienced personnel (which found readiness declining). Although all these

³⁰ CNA Home Website. "Corporate Overview." Go to: <http://www.cna.org/corp/cna.html> last accessed by author November 2002.

³¹ "Tech Prep is a federally funded program aimed at improving the academic and technical skills of high school students. The most common model is a partnership between a community college and the secondary school divisions with its service region, which forms a Tech Prep consortium. The consortium establishes programs in which high school students explore and pursue a technical career field. These programs are intended to include the last 2 years of high school, to lead to a 2-year college degree or vocational certificate, and to result in technical job placement." (Golfin and Blake 2000, 3-4)

studies are of value to study, CNA is now doing much less manpower research than in former years.

RAND is another not-for-profit research center that does manpower analysis. RAND originated in 1945, first as Project RAND under Douglas Aircraft Company. By late 1948, it had transitioned into an independent entity (RAND Corporation) with national security studies as its focus. RAND originally concentrated on U.S. Air Force (USAF) technical issues, but by the mid-1960's it had gained a reputation of being able to handle issues in social science and economic fields as well. Perhaps RAND's, biggest impact on the military was its development of the planning, programming, and budgeting system (PPBS) introduced to DOD by then Secretary Robert McNamara in the early 1960's, and later mandated as the federal standard under President Lyndon Johnson in 1965. RAND did its first manning requirements study in the late 1960's, but the 1970's and 1980's were the banner years for RAND in manpower studies. In a 1996 report, entitled "Project Air Force 1946-1996," James Hosek describes some key developments in military personnel management:

Starting in 1971, researchers used linked data to develop an empirical, Markovian model of personnel flow, opening the way to a flood to (sic) improvements. Work in the early 1970s laid out the logic for several models for officer personnel management, giving serious treatment to promotions, grade constraints, and early outs. This work prompted the development of a series of dynamic, disaggregate, behaviorally driven, and increasingly capable models for officers and enlisted personnel over the next 20 years.

A 1974 RAND critique calling for the inclusion of an economic model of retention decisions was followed up with development of a pathbreaking dynamic retention model. This research was influential in the passage of the Defense Officer Personnel Management Act. It also has been the basis for subsequent RAND analyses of the structure of military compensation, the retirement system, and the design and effects of separation pay, which was implemented in the 1990s to help achieve the defense manpower drawdown. (Hosek 2002, www)

As previously seen in other organizations, RAND has redirected its research since the end of the Cold War away from national security issues exclusively and into much broader areas. However, RAND, which still provides significant work in the manpower area, released an excellent report in 2001 that fully examines enlisted military compensation. The study report entitled, "Patterns of Enlisted Compensation," is a necessary primer for newcomers to military manpower planning.

Military compensation is complex, consisting of over 70 different pays and entitlements, some of which are cash payments and some of which are in-kind transfers. The complexity can produce very different levels of compensation, both across and within services, for people who appear similar by most measures. Given the power that compensation can have as a management tool, it is important for DoD policymakers to understand the components of military compensation and where and how they vary. (Kilburn, Louie, and Goldman 2001, iii).

Another major RAND study, "Educational Benefits Versus Enlistment Bonuses: A Comparison of Recruiting Options" by Asch and Dertouzos in 1994, followed Army enlistments in the early 1980's and tracked them through 1988. The study showed that educational benefits were far superior to other recruiting efforts such as offering bonuses, increasing recruiters, or additional advertising, when the goal was to attract high quality personnel. This finding was also confirmed by Gray in 1987 in her thesis entitled "Influences of High Quality Army Enlistments." In this study, those scoring in the upper half of the Armed Forces Qualification Test (AFQT)³² reported that, if it were not for the Army College Fund (ACF) program, they would have not joined the Army. Borus and Kim in a DMDC study of 1985 used the National Longitudinal Survey of Youth, 1979-81. They concluded that, among high school graduates who were not attending college,

³² The AFQT is designed to measure the general trainability of a new entry candidate. Another test the Armed Forces Vocational Aptitude Battery (ASVAB) is designed to help classify individuals into job categories in which they have the best chance of success.

those with higher educational aspirations preferred military to civilian alternatives, and pay was neither a strong incentive nor a disincentive to enlistment.

The Naval Postgraduate School in Monterey, California, provides graduate education in academic programs tailored to meet the needs of the Navy and often relevant to the other services. One of its master's degrees is given in Manpower Systems Analysis. Upon graduation from this course, students are expected to help, in future subspecialty assignments, develop and analyze Navy personnel policies. Analysis would include critically examining the strengths and weaknesses of proposed manpower policies and suggesting alternatives. The curriculum emphasizes mathematical, statistical, economic, and other quantitative methods. The school spends eighteen to twenty-one months (depending on undergraduate background) to introduce the future analysts to such topics as requirements determination, billet authorizations, cost and end strength, and issues of recruiting, attrition, retention and compensation. The curriculum web site provides further information:

The areas covered in the MSA (Manpower Systems Analysis) curriculum include an understanding of manpower, personnel, and training policy development, managing diversity, compensation systems, enlistment supply and retention models, manpower training models, manpower requirements determination processes, career mix, enlistment and reenlistment incentives, training effectiveness measures and hardware/manpower trade-offs. Students gain familiarity with current models and methods of manpower analysis as well as military manpower organizations, information systems and issues.³³

The program requires a thesis, which occasionally produces significant research, and several MSA studies used in this dissertation are listed in the bibliographic section. However, more commonly a student's thesis concentrates on a very specific officer designator or enlisted rating. The value of this education comes to the Navy later if this

³³ Naval Postgraduate School Website. "Manpower Systems Analysis (Curriculum 847)." Go to: <http://www.nps.navy.mil/ofcinst/code847.htm> last accessed by author November 2002.

graduate is assigned to a personnel management billet. She or he is then able to understand studies produced by other organizations and to properly use models already in place.

Summary of Recent Technical Reports

Although technical reports vary in length they generally focus on one topic and conduct scientific research on a thesis of current importance. The eight page table following this short introduction provides an overview of key findings of technical reports consulted during this research work. This table which provides a convenient summary of technical reports of the last few decades used in this study, and should provide a solid base of information for others deciding to conduct further research on this subject.

A vast organization of DOD personnel and contractors were conducting Navy manpower research during the 1970's and 1980's. In the 1970's the idea of manpower modeling was just taking hold in the Navy management world. Attempts were made to introduce the idea of manpower management, to conduct initial surveys, and to construct basic models. In the 1980's during the Navy's build-up, models from the 1970's were used to construct the form of the new Navy manpower system and small models were integrated in to bigger and bigger management systems.

Funding for manpower research and modeling was greatly reduced in the late 1980's as the increase in Navy growth slowed. Then, throughout the 1990's, further manpower research reductions occurred as the Navy shrank in size. It has only been in the last few years that a somewhat renewed emphasis has been placed on manpower research. Unfortunately, most of this new research has not really questioned the

appropriateness of the Navy's using models designed two and three decades earlier and their relevance to 21st century issues. On a positive note some new research has begun to identify quality of life issues and other matters of concern such as the way the Navy approaches the education and training of its sailors.

In the following table, listed to the left are the topics covered in this summary. As will be evident, these subjects form the basis of information organized and discussed in this dissertation. To the right of each line is a summary of noted findings. In the center are listed, the authors, dates and identifications of the studies to allow the reader the information to obtain the study. It should be noted that studies on education are more numerous than any other issue.

Table 5. Summary of Recent Technical Report Findings

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
<u>Delayed Entry Program</u>	Cooke, Timothy W.	1987	Center for Naval Analyses, ADA191786		Targeted enlisted bonuses by season, keep costs down and even out high-tech accessions.
	Manganaris, Alex G., and Chester E. Phillips	1985	U.S. Army Research Institute for the Behavioral and Social Sciences, ADA167847		Delayed entry program can work best by specifically targeting high-tech.
<u>Educational Benefits</u>	Gray, Rosanna L.	1987	Naval Postgraduate School Thesis, ADA180562		Educational benefits strongly influence high-tech and high quality enlistments.
	Asch, Beth J., and James Dertouzos	1994	RAND, MR-302-OSD		Educational benefits are more cost effective than bonuses, or increasing the number of recruiters or advertising.
	Elig, Timothy W., R. M. Johnson, P. A. Gade, & Allyn Hertzbach	1984	U.S. Army Research Institute for the Behavioral and Social Sciences, ADA164230		Every 100 enlistments joining for college monies are estimated to fill 35 high-tech spots that would otherwise remain open.
	Golfin, Peggy A., and Darlene H. Blake	2000	Center for Naval Analyses, CRM D0000399.A1		2 year colleges can be an effective source for recruits. Tech Prep is a program that partners with community colleges. Navy partnership with Tech Prep should help the Navy gain recruits for high-tech fields.

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted Finding(s)
<u>Educational Benefits</u> <u>(Continued)</u>	Borus, Michael E., and Choongsoo, Kim	1985	Defense Manpower Data Center, ADA185414	High school graduates with higher educational expectations, but who are not attending four year colleges are more likely to enlist for educational benefits, and therefore educational benefits are good incentives for recruiting at community colleges.
	Orvis, Bruce R., Narayan Sastry, and Laurie L. McDonald	1996	RAND, MR-677-A/OSD	Educational benefits are cost effective in high-tech recruiting to lessen shortfalls.
	Hosek, James R., John Antel, and Christine E. Peterson	1989	RAND N-2967-FMP	Attrition is highest among people who do not expect to obtain further education from the military if they remain.
	Asch, Beth J., M. Rebecca Kilburn, and Jacob A. Klerman	1999	RAND, MR-984-OSD	Proposes new options for attracting college-bound youth into the armed forces, and getting benefits out of GI Bill that are currently used after a person leaves active duty.
	Thirtle, Michael R.	2001	RAND, MR-981-OSD	Formal education is not rewarded in the promotion process of enlisted, and of little value in officers.
<u>Recruiting Tactics</u>	Orvis, Bruce R., and Beth J. Asch	2001	RAND, MR-902-A/OSD	Long term recruiting should target ability to recruit persons interested in attending 2-yr colleges.

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
<u>Recruiting Tactics</u> <i>(Continued)</i>	Brown, Charles	1984	U.S. Army Research Institute for the Behavioral and Social Sciences, ADA165663		Additional recruiters are required to effect the recruitment of high-quality, high-tech recruits.
	Orvis, Bruce R., Martin T. Gahart, Alvin K. Ludwig, & Karl F. Schutz	1992	RAND, R-3775-FMP		Almost half of all enlistees come from persons who initially express no interest in the military. Recruiting approaches must exclude no group out of hand.
	Fernandez, Judith C., and Dennis De Tray	1984	RAND, N-2064-MIL		Former enlisted personnel are a valuable pool of trained personnel, & could be used more effectively.
	Cymrot, Donald J., ed.	2001	Center for Naval Analyses, CAB D0003425.A1/ Final		The Navy must change its recruiting model from its practice of recruiting almost exclusively from non-college-bound high school graduates.
<u>Training</u>	Smith, Keith E.	1986	Air Force Institute of Technology, ADA174565		School training and education is more cost effective than on-the-job training.
	Wild, William G., and Bruce R. Orvis	1993	RAND, R-4242-A		Education in the classroom is more cost effective than on-the-job training.
	Orvis, Bruce R., Michael T. Childress, & J. Michael Polich	1992	RAND, R-3901-A		Higher AFQT scores are associated with better performance in high-tech jobs.

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
<u>Training</u> <i>(Continued)</i>	Golfin, Peggy A, John D. White, and Lisa A. Curtin	1998	Center for Naval Analyses, CRM 97-97	Community Colleges can provide training that is similar to that of the Navy but at lower cost.	
	Winkler, John D., and Paul Steinberg	1997	RAND, MR- 850-A/RC	Reports ways the military can make schoolhouse training and education more effective. Suggests that the new approach in a high- tech world should be more educationally based.	
<u>Econometric</u> <u>Models</u>	Goldberg, Matthew S., and John T. Warner	1982	Center for Naval Analyses, CRC 476	Pay elasticities vary widely across occupations, so targeting specific pay elasticity by rating is the best retention method.	
	Hansen, Michael L.	2000	Center for Naval Analyses, CRM D0001998.A2	Found Navy high-tech occupations to command the highest civilian salaries and have the most severe manning problems.	
	Chow, Winston K., and J. Michael Polich	1980	RAND, R- 2468-MRAL	Moving to having all benefits given in cash would be detrimental to retention.	
	General Accounting Office (GAO).	1996	GAO/NSIAD- 96-153	Excellent historical review of active military personnel compensation during the 1990's.	
	Asch, Beth J.	1993	RAND, MR- 161-FMP	The best matches between job and person are ones that do not force people to move up in rank.	

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
	Hansen, Michael L., and Jennie W. Wenger	2002	Center for Naval Analyses, CRM D0005644.A2		Pay elasticity in different models describe the same behavior, but how much of retention is ascribed to the elasticity varies greatly within models.
	Norton, Lee	1989	Navy Personnel Research and Development Center, NRPDC TN 89-26, ADA209871		An historical review of Navy manpower models developed between 1966 and 1989.
<u>Retention</u>	Lewis, Philip M.	1985	Leadership and Management Development Center, ADA164899		Family support programs are useful in increasing spousal support and resultant retention.
	Ward, Michael P., and Hong W. Tan	1985	RAND, R-3117-MIL		Tracks high-quality personnel after AVF to early 1980's high-tech find high-tech personnel leaving at same rate as entering, thus increases in high-tech will be difficult.
	Asch, Beth J., James R. Hosek, and John T. Warner	2001	RAND, DB-344-OSD		Discusses current pay practices and their ability to recruit and retain personnel.
	General Accounting Office, (GAO)	1999	GAO/NSIAD-99-197BR		Actions to retain critical specialty personnel must address workplace and quality of life factors. Provides list of quality of life factors that affect service personnel retention.

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
<u>Management</u>	Kirby, Sheila Nataraj, and Harry J. Thie	1996	RAND, MR-755-OSD		Historical look at enlisted personnel management ideas such as quality, specialization and compensation.
	Golding, Heidi L. W., Jeremy A. Arkes, and Martha E. Koopman	1999	Center for Naval Analyses, CRM 99-58		The Navy must pay an earnings premium of between 13 and 34 percent, to compensate between general skills and high-tech skills.
	Koopman, Martha E., and Heidi L. Golding	1999	Center for Naval Analyses, CRM 99-59		Recommends changes in workforce policies including detailed changes away from the Navy's "up or out" and manpower pyramid billet structure.
	Koopman, Martha E., Steve Cylke, Heidi L. W. Golding, Michael L. Hansen, and Thomas Husted	2000	Center for Naval Analyses, CRM D0002082.A2		Recommend changes to compensation and Navy management system to meet Navy-specific goals, e.g. new career structures, voluntary assignments and targeted pay.
	Levy, Dina G., Harry Thie, Albert A. Robbert, Scott Naftel, Charles Cannon, Rudolph H. Ehrenberg and Matthew Gershwin.	2001	RAND, MR-1304-OSD		Examines how future military missions, organizations and technology will affect work and workers in DOD. Future workforces will have to be more advanced in technical knowledge and be required to stay current in their fields of specialization.

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
<u>Management</u> <u>(Continued)</u>	General Accounting Office (GAO)	2000	GAO/T-GGD-00-77		Stresses need for all Federal agencies to use strategic human capital management practices and other private sector management practices.
	Robbert, A.L., Brent Keltner, Ken Reynolds, Mark Spranca, and Beth Benjamin	1997	RAND, MR-838-OSD		High-tech communities would benefit from a differentiation in management techniques from more traditional core combatant groups.
	General Accounting Office (GAO).	2001	GAO-01-244		Identifies recruiting and retaining high skill personnel as one of the key areas facing the military, and suggests new management practices as key to this change.
	Thie, Harry, Margaret C. Harrell, Roger Brown, Clifford Graf, Mark Berends, Claire Mitchell Levy, and Jerry M. Sollinger	2001	RAND, MR-788-OSD		Attempts to design a "best" management system for officers. Suggesting moving to an objectives-based system. Recommendations include closed career system, pre-entry training with six-year initial obligation, longer tours and more civilian education.
<u>Requirements</u> <u>Determination</u>	Marcus, Alan J.	1985	Center for Naval Analyses, CRM 85-111.10		Model that shows changes in size of fleet on individual billets.

Table 5 *Continued*

Topic	Author(s)	Year	Report No.	Noted	Finding(s)
<u>Requirements Determination</u> <i>(Continued)</i>	Gates, Susan M., and Albert A. Robbert	1998	RAND, MR-980-OSD		Examines costs of transferring some military functions to civil service personnel.
<u>Non-Pecuniary</u>	Warner, John T. and Matthew S. Goldberg	1981	Center for Naval Analyses, PP-337		Navy could increase ship manning more cheaply by offering bonuses than holding sea time constant.
	Kear, William James	1989	U.S. Naval Postgraduate School, Student Thesis, ADA222017		Reveals wide variation in attrition rate of enlisted personnel between individual ships and respective ship classes.
<u>Reports Linked to DMDC 1999 Survey</u>	General Accounting Office (GAO)	2001	GAO-02-200		GAO links low first term retention to the disconnect between recruiting policy stressing education and a military that does not allow it during active duty.
	General Accounting Office (GAO)	2000	GAO/T-NSIAD-00-110		Preliminary report of 1999 survey report that pay is not the controlling factor in why personnel leave the military.
	General Accounting Office (GAO)	2001	GAO-01-785		Retention-critical personnel are not being "pushed out" of the military by their experiences but more likely they are being "pulled out" by more attractive civilian opportunities.

Note: Publications in this table that have a report number that starts with AD as the technical note identification can be obtained from the Defense Technical Information Center (DTIC) 8725 John J. Kingman Road, Suite 0944, FT. Belvoir, VA., 22060-6218. Others are published directly by the originator such as RAND or CNA Corp.

CHAPTER THREE

U.S. NAVY MANPOWER AND PERSONNEL MANAGEMENT

Manpower

To clarify the differences between the terms "manpower" and "personnel management", as they are understood in the U.S. Navy and used in this dissertation, it may be useful to begin with this description:

Manpower is a term with many meanings. It is associated with such things as labor-force measurement, matching the supply of people with the jobs available, government training programs, civilian staffing requirements, military manning requirements, personnel management, statistics, labor economics, organizational behavior, and manpower planning.

In the broadest sense, the term *manpower* encompasses the requirements for human resources, the supply of human resources, and ways to reconcile requirements and supply to achieve organizational goals. It subsumes the personnel and training functions necessary to manage human resources. All Navy manpower research, then, really comes down to two questions: (1) How many people of what kind are needed to operate, maintain and support the Navy? and (2) How can those people be obtained at a reasonable cost? (Lockman 1987, 1, emphasis in original)

People are a nation's most important "natural" resource, and like any other resource, they can be used wisely or merely wasted. A nation that properly utilizes its human resources can reach full potential, while the nation that allows this resource to remain idle will soon fall from prominence. In general, wasting human potential means allowing it to be underdeveloped, unemployed, or underemployed. Most developed societies do not expect the very young and very old to be "producing" in the same manner as the rest of the population, but ignoring the contributions of even these groups means squandering talents and resources.

Perhaps the most self-destructive means of underemployment comes through societal inefficiencies caused by racial, religious, or sexual discrimination that keeps individuals from reaching their full potential. A second means of underemployment comes about when humans are undereducated. Educated workers are a tremendous asset to a nation since they are able to apply their educationally gained insight to both present and future problems. A third possibility of underemployment appears when people are being mismanaged at their workplace. Workers in an organization that stifles personal achievement or ignores job satisfaction will not contribute at the same level as those energized by their work assignments. Morale is no small part of the ability of manpower to contribute to the nation's welfare.

Emerging societies begin their development by concentrating on the most elementary needs of their people and thus are at first mainly agriculturally based. In the United States developmental history, human and animal power soon yielded to water and fossil fuel power, such as wood and coal. The introduction of machinery gradually allowed farm production to demand less manpower in the nation's quest for adequate food supply. Steam, petroleum, and electricity, as sources of power, brought further advances in food production. Science soon allowed chemical pesticides and fertilizers to increase output per acre without requiring additional farm hands. Having exceeded its requirement to produce agricultural products to meet internal basic needs the nation used this labor force to industrialize. With an excess of farm laborers, many people felt free to move into newly forming industrial and service jobs. In sum the more technologically advanced any society becomes, the more the society then moves manpower from industrial "product-oriented" jobs into "service-oriented jobs." The United States long

ago made these shifts in personnel. As Falk notes from 1963 and 1964 Reports to the President³⁴: the size of white collar work force first exceeded that of manual workers in 1956, and since 1961, white-collar workers have exceeded blue-collar and farming workers combined (Falk 1966, 5).

Manpower utilization is a social and cultural choice. How much does the nation value and promote education? How much mobility will it demand from its citizenry? What is the role of government in supporting temporary and long-term unemployment? What is the government's role in the free market, in supporting research and development, and in labor vs. management disputes? A manpower issue that is most important for this study is the question, "How does the society provide personnel for its military?"

Manpower problems for a nation are exacerbated in time of war or near war as the military is expanded. Usually these expansions are large in size and quick in nature. This sudden transfer of resources can be most disruptive to the national economy, and not only for the duration of the war or call-up. Even afterward, this redistribution of labor often sets in motion societal changes that never quite return at war's end to pre-war stasis. The willingness to of a nation to provide people for its military is vital to the nation, not only in the most obvious time of war, but also during periods of peace. In fact, a nation relies on its triumvirate of national powers (i.e., economics, diplomacy, and military) to secure its national interests, which include economic growth, promotion of values, and maintenance of peace and security.

National strategy fuses all the powers of a nation, during peace as well as war, to attain national interests and objectives. Within that context, there is an

³⁴ Data found in Manpower Report of the President (1963), pp. 25-30 and Manpower Report of the President (1964), pp. 18-24.

overall political strategy, which addresses both international and internal issues; an economic strategy, both foreign and domestic; a national military strategy; and so on. Each component influences national security immediately or tangentially. (Collins 1973, 14)

In peace, effective utilization of personnel ensures successful employment usage of the three national powers. Regarding diplomacy, for foreign policy to be most effective, a nation must show that its people have the will and the might required to back up their stated principles. As for economic issues, since globalization continues to intertwine nations and their futures, international systems must recognize the rule of law. Concerning the military, without sufficient power to enforce international rules, severe threats to American physical and economic security seem likely to continue many decades into the 21st century.

Internally, a democracy is especially vulnerable if it fails to provide proper incentive to its people so they can achieve their best. The standard of living of the nation must be sufficient for its people. If it is not, it must at least be on the rise, giving those slighted the promise of a brighter future. While economic growth is not an end-all, it should foster or at least support basic freedoms and the dignity of individual citizens. Work must be more than something that is required for survival. People aspire in the work place to do more than just produce for the company's benefit. This desire is no less true of people serving in the armed services. As the American military developed over the last two centuries, it moved from being a band of local minute-men into a profession of arms. To achieve professionalism, the American military seemingly separated itself at first from its civilian counterparts by its regulations and management practices (Huntington 1957). However, the U.S. military later turned to narrowing those differences to reintegrate itself back to the larger society (Janowitz 1960).

Today America's highly-trained and professional military personnel are seeking the same kind of rewards in their work as are other professionals found in the larger civilian workplace. This fundamental change in how the military sees itself, while not without concerns, is unlikely to be reversed:

Since World War II, the status of the military in society has changed, the importance of the military function has declined, and the meaning of military service is less clear than in the past. The military is no longer viewed as a special organization that performs a unique and important function critical to the survival of our society. This redefinition has been forced by at least three major social changes. First, the nature of the military task has changed.... Second, technological change has fragmented the military organizations into many specialties... Third, ... limited national economic resources have caused increasing reliance on management principles and cost analysis in lieu of military expertise.... The issue of "who is military" and "what the military does" is no longer clear. This confusion provides the opportunity to replace military expertise and values with the more widely accepted management principles and ethics characteristic of the occupational model. (Wood 1988, 30)

Personnel Management and Conscription 1950-70

World War II left its mark on battlefields across most continents, and by social changes in cultures worldwide. In 1940-45 for the U.S. to meet the challenges of personnel for military members and for full industrial capacity a great expansion in two categories of workers occurred on the home-front. A significant number of 14-19 year olds began participating in the labor force. Simultaneously, the number of women working outside the farm and home increased dramatically. Women who had been mostly homemakers were now expected to contribute significantly to the national industrial base by replacing men in needed wartime production. This substitution of women in stateside work was required to free-up males for service in the military. Personnel planners believed that upon conclusion of World War II, women would mainly return to their former domestic duties. The increase in the country's birth rate that had been going on

since the 1930's, combined with the expected new younger workers, would all but guarantee sufficient manpower for a needed standing military and provide a significant pool of people to expand it in a future time of national emergency.

At War's end both women and young males faced the reality that men returning home from the military were competing with them for jobs in the civilian workplace. To the surprise of some, women were often reluctant to yield to the returning soldiers and sailors. While in the past women had traditionally returned to roles held prior to wartime, after World War II American women in increasing numbers stayed in the employed ranks.³⁵

Several reasons explain this trend. First, the women had proven themselves during the war by handling a variety of jobs outside traditional clerical positions; therefore, employers were far more open-minded concerning their capabilities. Second, women would often take jobs at lower pay than men. After the war, a high demand for workers continued, with part-time and full-time jobs in greater supply than usually seen in post-war periods. Third, a high percentage of those women were over thirty years of age, with children beyond elementary school. Fourth, the rising costs of living also contributed to this influx of married women into the workforce. Finally, perhaps the biggest factor for women's participation in the labor market occurred when banks changed their traditional home loan approval procedures to include more than one income in their home mortgage

³⁵ The "manpower pool" includes those men and women of 16 years or over who are capable of useful military or civilian service. A subset of this is the "labor force," which are those who are employed by the military or in civilian employment or who are unemployed but seeking work. (Housewives, househusbands and farm workers with less than 15 hours per week are not counted as employed.) The civilian labor force is the sum of employed and unemployed persons. Those not classified as employed or unemployed are not in the labor force. The unemployment rate is the number unemployed as a percent of the labor force. The labor force participation rate is the labor force as a percent of the population, and the employment-population ratio is the employed as a percent of the population. Source: U.S. Department of Labor Web site: http://www.bls.gov/opub/hom/homch1_c.htm last accessed by author in February, 2003.

calculations. Initially seen as desirable, two incomes soon became essential to enter the home owner market. Cumulatively these changes led to the proportion of women in the work force rising from 27 percent in 1947 to 33 percent by 1963 (Falk 1966, 26).

The younger manpower group, however, displayed the exact opposite trend and although young males in the nation were more numerous their percentage in the work force declined over this period from over 22 percent in 1947, to under 20 percent by 1964 (Ibid., 24). One reason for this decline was that this younger group seemed to split itself into two subgroups. One subgroup, which saw education as the path to success, whether from work or military service, returned to education. Some returned to and then stayed in high school while others pursued college. This education subgroup grew steadily after World War II. The other subset of mainly unskilled young men, enticed by thoughts of a steady income and/or marriage and families, turned directly to the market place. There many found entry-level, assembly-line, cashier, or food service type work. The unemployment rate of these low-skilled young, who did not stay in school, continually rose. The uneducated young often found disfavor from employers who perceived them as generally needing greater supervision, having lower hygiene standards, and wanting very flexible and shorter hours. Intellectuals debated the sociological question, "Would it be more beneficial to the nation for young people to go directly into industry or the military or should they remain in education?" In the market place, however, the lack of jobs for the unskilled and the demand for high-tech training often tipped the scales of young workers toward the answer of higher education. Those who chose the military found training instead of education but gathered much needed work experience that allowed them to compete in the civilian skill-related job market after their initial obligation.

Education or Military Service

The term education as used in this study may be divided into four areas. The first being formal education of the type most think about when the word is spoken. In the United States this begins with twelve years of free and mainly compulsory schooling.³⁶ In parallel to this public education system is a private and religious system with state controlled minimum standards that regulate the process. Following secondary education there are two-year and four-year private, public and religious colleges, and technical schools, along with a myriad of certificate programs of varying length. At this level, most higher education institutions themselves have bonded together in regional accreditation programs to provide and maintain performance standards. Finally, there are graduate level institutions conducting masters, doctoral and post-doctorial degree granting programs.

A second category of education would include a wide range of independent programs. These programs are commonly labeled as "adult education" or "continuing education." These are sometimes designed and run by businesses for their own employees, usually when a business desires to cut training time required by education institutions and instead chooses to tailor longer traditional subjects to more specific job-oriented knowledge. In recent years in response to this type of business initiative many courses of this type are being often offered by the previously mentioned education system of high schools and colleges. These traditional education facilities are attempting to reach out and teach individual subjects to adults without expecting students taking such courses

³⁶ There are exceptions to compulsory education such as in many states a student 16 and above may quit school with parental permission, or may do so independently without parent approval at 17. Additionally, there are rules that usually allow schools to stop providing "public" education if the student reaches age 22, even if the student has not completed all twelve grades.

to ever become full-time students. Instead they offer courses leading to "certificates" or classes that answer a specific need in the worker's career progression scheme.

A third means of education is self-education. Never expecting a reward in the form of a degree or certificate, an individual may be seen as setting out on their own path to "educate" themselves, on that which is important to them. Until the days of the internet this was usually done through use of the library, and the process was research and reading books. In the information age of today the ways of gaining information for self-education are greatly expanded.

The fourth kind of education is that found in the military's training and education programs. The services provide training important to the service's immediate missions. This training and education system was often ignored by the civilian institutional credit system, although it has been highly prized in the business community for years. Although since World War II there has been some work in granting credit for military training in civilian institutions a majority of the work in this area began only during the last decade of the 20th century. Now routinely technical schools and colleges are giving degree credits to formal schools training received by service members while they serve in the military.³⁷

Nations generally view education of its populous as a prudent investment. Attempts of exact quantification have been tried since the time of Adam Smith in his An Inquiry into the Nature and Causes of the Wealth of Nations, when he emphasized the value of education. Educators like to stress the idea that since humans are quite complex, we cannot identify full potential through standardized tests, and thus the best way to

³⁷ Since 1942, the American Council on Education (ACE) has worked with the Department of Defense to identify military education and training courses and experience and translate it into academic credits at educational institutions.

ensure that human resources are not "wasted" is to provide educational opportunities to the widest possible audience. Talent will develop at different ages, so you cannot just select a few of "Xth" graders and only offer them further education and ignore the rest of their classmates.

Leaders in our own nation point out that our relatively strong position in the world today is a direct outcome of over one hundred years of investment in a free and universal public school system. Leaders of most nations, young or mature, free or totalitarian, believe that their long future is directly dependent on the investment they can make in generally educating the total populace and in specially educating the gifted for their leadership contributions. (Hanna 1962, 2.)

Whatever kind of education a person receives it is generally seen as increasing their value to the nation. Generally, education is also expected to provide an increased earning potential to the individual (Miller 1962). During the post World War II period, industry began to incorporate more and more technology into its production process, and with this came an increasing reluctance to accept new employees who did not have as a minimum a high school education. Also industry began to equate a high school diploma with the qualities of perseverance, achievement, and trainability. A general laborer lacking a high school diploma could only overcome this deficit with "job experience." To get a job one must show good performance in past jobs. This of course is very hard to do when first entering the work force, so the military seemed to be a plausible option out of this dilemma.

Business greatly prefers to train rather than educate, because training is initially shorter and cheaper. Training is designed to a specific assignment, while education is interested in broad concepts that the graduate can apply in diverse circumstances in the future. Education is a lifelong process of learning things that allow thinking creatively in an unpracticed environment. Training is designed to teach a specific skill set. Technology

advances occur so quickly in the world of business that humans are expected to quickly adapt to the constant new environments created by technical changes. Pre-employment education is expected to provide the base knowledge required for this adaptation, while business usually sees itself as supplying "training" for job requirements. When a new technology is introduced to the workplace, often these technology advances also reduce the need for unskilled labor and increase the need for thinkers. "As it lifts burdens from the human back technology renders human muscles industrially obsolete. And... the disengagement of men's backs and arms must be compensated for by the engagement of their minds" (Fischer 1962, 195-196). Progressive businesses recognize the need to interact with high school and college curriculum developers and the need of the nation as a whole to expand the education base of its workforce. Formal educational systems provide fundamental knowledge, but specialized training must be eventually provided by the employer. If the business world effectively makes its requirements known to educators, less and less entry-level training will be required by employees. Education seems to be the most direct way of avoiding human obsolesce in a technological world.

A democracy must decide, "Who should pay for education?" In the U.S., the answer for education through the high school level has been a combination of state and local government-run school systems that depend on general local property taxes and other state and federal tax support. Higher education saw a substantial rise in publicly subsidized two- and four-year colleges in the last half of the twentieth century.

The military following World War II was increasing its use of technology, and did place a premium on education and training in its enlisted ranks as well as in its officer corps. The services were able to provide an attractive alternate skill enrichment and

development path for many young persons without a proven trade and who were not headed for traditional higher education. The military was especially attractive to high school graduates who did not have monies for college or who had reached the point of desiring to take a break from education. Americans during this time saw military service as an honorable alternative to college for its young. Most of these young people had reinforcing contact with a family member who had served previously and reported, nearly unanimously, that military service was a good way to either gain trade training and job experience, to save monies for college, or to expend youthful energies. To many young males during hard economic times the choices were college or military. This same pattern of either college or not college was equally engrained into the Navy's recruiting practices. Recruiters went to four-year colleges looking for officers and recruiters searching for enlisted personnel concentrated on students "with no plans for college". Even today the Navy seemingly ignores people going to two-year colleges or those with Associate degrees when it recruits. Several current studies have pointed out this problem.

As we have discussed in previous research, however, the Navy recruits very few 2-year college graduates into the enlisted ranks. For instance, although there were over 520,000 Associate degree graduates in the 1998-99 academic year, the Navy recruited only 316 people with Associate degrees in FY99. Likewise relatively few of the college dropouts are subsequently recruited. In FY99, only 1,950 recruits entered with some college but less than a degree. (Golfin and Blake 2000, 9)

Congscription's Role In Meeting Surge Military Manpower Needs

Williamson Murray promotes the idea that modern history has been marked by four great military revolutions.

There appear to be two distinct historical phenomena involved in radical innovation and change. The first can be called military revolutions. These were by far the more important, for they fundamentally changed the nature of warfare in

the West. There appear to have been four (two occurring at the same time): creation of the modern, effective nation-state based on organized and disciplined military power in the 17th century; the French Revolution and the industrial revolution beginning at the same time during the period 1789-1815; and World War I, 1914-18. We might compare them in geological terms to earthquakes. They brought with them such systemic changes in the political, social and cultural arenas as to be largely uncontrollable, unpredictable, and above all unforeseeable....

Such "military revolutions" recast the nature of society and the state as well as of military organizations. (Murray 1997, 70-1)

Of special interest to this study is Murray's first military revolution of the seventeenth century, when the central governments of nation-states began to control the military in a far more stringent manner than the past. Because the state could now raise taxes they could ensure that soldiers and sailors would be paid regularly and be less likely to pillage their own country. The second military revolution of interest occurred during the French revolution and was the introduction of the idea of conscription. Although today we commonly expect that in times of crisis a wider sampling of citizens would be found in the military, this idea largely developed during the French Revolution. The French found that they could accept inefficiencies in the execution of battle plans if sufficient personnel were made available to overcome effectiveness differences. Today, one might say this was quantity making up for quality. This ability to quickly raise an army is best illustrated in Article I of the famous decree announcing the first *levee en masse*, or general conscription, in 1793.

From this moment until that in which our enemies shall have been driven from the territory of the Republic, all Frenchmen are permanently requisitioned for service in the armies.

The young men shall fight; the married men shall forge weapons and transport supplies; the women will make tents and clothes and will serve in the hospitals; the children will make up old linen into lint; the old men will have themselves carried into the public square to rouse the courage of the fighting men (and) to preach the unity of the Republic and hatred against Kings. (Fuller 1961, 32)

Conscription in the United States currently is managed under the "Selective Service Act of 1948,"³⁸ first with numerous extensions on the basic act³⁹ and then public law changes in "The Military Selective Service Act of 1967" (Public Law 90-40), as amended by "The 1971 Amendments to the Military Selective Service Act" (Public Law 92-129). In 1940, then President Franklin Roosevelt signed the "Selective Training and Service Act of 1940," which created the country's first peacetime draft and formally established the Selective Service System. (The 1940 Act expired after World War II in 1945, but the 1948 Act recognized that an unsettled world environment was still prevalent.)

So from 1948 until 1973, during peacetime and the periods of conflict in Korea and Vietnam, men were drafted into the military to increase manpower above volunteers to needed levels. At the end of December 1972, monthly induction calls were stopped as the nation moved to fill military requirements with an All-Volunteer Force (AVF).

Originally it was planned to have the process of registration continue even though induction calls had ceased and to move registrations from monthly to yearly. However, political pressure against even yearly registration became so strong that the entire registration requirement was suspended in April 1975.

Although registration was resumed again in 1980, by President Carter in response to the Soviet invasion of Afghanistan, the underlying system of draft boards and administration has been allowed to atrophy. Today, young men are required to register

³⁸ Described in "Title 50 - War and National Defense", Appendix - War and National Defense Military Selective Service Act of June 24, 1948, Chapter. 625, 62 Statute. 604.

³⁹ The outbreak of the Korean Conflict first caused a one-year extension of the 1948 draft law and then in 1951 a 4-year extension. Additional Congressional four-year extensions came in 1955, 1959 and 1963. Despite intense debate "The Military Selective Service Act of 1967" did little to change the existing system.

and the plan would be to use a draft selection process on eligible males should an intense and extended crisis arise. Under the current system a male would spend only one year in first priority for the draft - either the calendar year he turned 20 or the year his deferment ended.⁴⁰ In subsequent years, the candidate will be assigned successively lower priority. Although in the system until age 26, it is unlikely that a candidate would be called after this first year of eligibility. Even if the system has fallen into neglect, there is not any change in the belief that a comparable system could be established should the military be called on for extraordinary operations. The same system of national mobilization including manpower recruitment in war, that was first introduced in the French Revolution, and produced the effective citizen soldier in World War II, officially remains as today's model. As Clausewitz noted, war and society were revolutionized by this concept.

Suddenly war again became the business of the people - a people of thirty millions, all of whom considered themselves to be citizens.... The people became a participant in war; instead of governments and armies as heretofore, the full weight of the nation was thrown into the balance. The resources and efforts now available for use surpassed all conventional limits; nothing now impeded the vigor with which war could be waged, and consequently the opponents of France faced the utmost peril. (Clausewitz 1984, 592)

Although regular articles appear in various newspapers debating a full return to the draft with some extolling its virtues,⁴¹ while others decry its inefficiency and authoritarian nature,⁴² the practical issue is that the U.S. military has moved beyond the

⁴⁰ Deferments are far less common than during the Vietnam conflict. For example, under the current draft law, a college student can have his induction postponed only until the end of the current semester. A senior can be postponed until the end of the academic year.

⁴¹ For one such article see: Godfrey Sperling, "Why the Draft Would Help the US?" Christian Science Monitor, (Boston Mass Edition), December 11, 2001, page 9.

⁴² For one such article see: Christopher Bassford, "Reviving Draft Would Wound The Nation" Long Island Newsday, December 2, 1998, page 54.

point where it can properly train soldiers and sailors, to utilize the military technology used in war, in the expected time frames that a draft assumes.⁴³

Labor Intensive Military Skill Requirements

Enlisted positions from World War II to the end of Vietnam were labor intensive in nature, and theoretically there were tens to twenties of millions of registrants to draw upon. The practical answer was that except for Korea and Vietnam less than 200,000 men were inducted each year, the rest were volunteers. During the 1950's and 1960's, the services had large numbers of men who had limited education and low aptitudes. It was not until 1958, that Congress approved stricter recruitment standards that allowed the military to concentrate recruitment on the three highest of five mental categories⁴⁴ identified by the military. In June of 1963, the services were granted more discharge options, to handle those who failed to adapt to military life.

As noted below military planners of the time expected high personnel turnover with the greatest loss in first-term enlistments.

To illustrate, at the end of fiscal year 1977, 58.6 percent of the 1.8 million enlisted personnel in the armed forces had served four years or less. During the year about 407,500 personnel were lost to the rolls, with 78 percent of them departing either before or upon completion of their first enlistment period. To maintain authorized strengths, the services brought about 411,000 personnel into the enlisted ranks - a turnover rate of roughly 23 percent. (Binkin and Kyriakopoulos 1979, 10)

⁴³ A draft, even if its record system was greatly improved, would expect a few months to start calling personnel and screening them for fitness. Then after induction into the service, the new member would require basic training and specialty training. Six months to a year would be expected to be required between initiation of the draft system and the first soldiers being assigned to front line units. This timeframe was acceptable through the 1980's, but current military operational planners count on forces being deployed within thirty to ninety days. Therefore, services count on their reserves to fill out active duty war time requirements. The draft would only be useful in a prolonged conflict.

⁴⁴ A description of these categories will appear later in this chapter. For a quick reference see Table 7 on page 138.

Most formal technical training given by the military is to entry-level personnel immediately following basic training. In the 1950's-1970's, about half of the Navy's occupational categories received some initial technical training which was in rather narrow fields of specialization. Since approximately only fifty percent of entry-level enlisted were high school graduates (and less than five percent college graduates), it was considered uneconomical to provide technical training to two-year conscripts. This saved time initially, getting conscripts directly to entry-level vacancies, but severely limited flexibility in their later assignments. Additionally, the number of technical training courses was on the increase with no end in sight. This early selection of trained and not trained caused a shortage of personnel available for advanced training, as operational units were expected to send assigned sailors "off to training" if they felt they needed more expertise. During this period of "out of hide" training the operational unit was not provided a replacement so normal duties of this "at training" technical sailor (if allowed to go at all) were absorbed by other members of the unit. Individual units saw great value in general detail sailors who would do on-the-job training and be of immediate use. In technical jobs a certain cross-occupation usage was expected by the on-site technician, due to overall shortages of technicians ordered into each unit and an unwillingness of units to send people for formal training.

No one was unaware of the growing amount of technology in use and the need for technicians; however, it seemed inevitable that a gap would always exist between emerging technology and the skill of the recruited sailor. The result would be more and more formal school training for sailors. The Navy realized that to respond to inevitable technological growth they would be required to attract and retain personnel with higher

potential. Simultaneously, civilian leaders in the Department of Defense (DOD) began to challenge military bureaucratic thinking about the mix of military and civilian jobs in the organization. New ideas were proposed to allow DOD civilian personnel and defense contractors to assume positions that had previously only been held by military members. CIVSUB (i.e. CIVilian SUBstitution) was the formal program introduced in the early 1970's to identify military shore jobs that could be replaced with full-time civilian workers. Moving away from a conscription mentality in issues of pay and career management also began to gain favor.

Military Personnel Management System

Simply put, military personnel management until the end of Vietnam was hardly more than an afterthought. Large numbers of personnel were expected to attrite at each advancement stage, and the threat of draft provided sufficient volunteers⁴⁵ to keep the input flowing at an acceptable rate. This recruit pool was seen as a deep reservoir with the practical preference of not having to go to deep, but no real concern about it not ever being adequate. The number of conscripts that were required greatly depended, of course on two factors, one being the size of the military that Congress desired and secondly the number of people voluntarily enlisting or re-enlisting. After the difference between volunteers and requirements was established the bank of personnel was opened to fill the void. Usually only unmarried men of the age 19-26 were selected for induction. The second level of recruits would be married men of this age group and finally men 27 to 35 would be considered.

⁴⁵ Many, who believed they would be drafted, would choose to join a service of their choice rather than being drafted. The volunteer enlistee could control not only their service choice but also then influence occupational assignments. Fewer choices were available to those who waited for direct draft induction.

Manpower management policy during the nearly three decades of postwar conscription was shaped in large part by three underlying principles. The first was the concern for *equity*, as opposed to efficiency, which frequently resulted in a "second-best" approach to manpower management. The second was the orientation toward maintaining a *youthful* force, and the corresponding emphasis on first-termers. Even though the combat arms make up only about 10 percent of total manpower strengths, this emphasis on youth derives in part from manpower policies based on the needs of the combat soldier. And third was the importance of *administrative simplicity* as a criterion for setting manpower policy. (Cooper 1977, 332, emphasis in original)

Peacetime re-enlistment rates and volunteer entry rates were assumed to be mainly affected by national economic conditions such as unemployment and minimum wage.⁴⁶

Re-enlistment rates are affected by economic conditions, compensation, housing, promotion and advancement opportunities, job satisfaction, group morale, public attitudes, and the age, rank, and length of service of personnel whose enlistments expire. Re-enlistment rates have risen greatly from the low point which they fell to in 1954. The most important re-enlistments from the standpoint of usefulness to the armed forces are those by men at the close of their initial periods of service. Re-enlistment rates for this group, averaged for the several services, increased from about 9 percent in 1955 to over 27 percent in 1962. Relatively high unemployment in 1957 and 1958 and in the early 1960s has helped to raise re-enlistment rates. (Falk 1966, 107)

As noted above, when unemployment rates rose in the period from 1955 to 1962, so did initial reenlistment rates from about 9 percent in 1955 to over 27 percent in 1962. Periods of war and immediate post-conflict times unsurprisingly showed the lowest retention rates. Although retention of personnel was preferable to new enlistments, because of the high costs of initial training, the fact was that demographics showed the nation's labor force was steadily growing, and consequentially, so would the military manpower selection pool.

Enlistment and retention decisions are influenced by many factors and not any one issue plays a defining role in every individual's decision. The social pressure felt by

⁴⁶ Support for this assumption can be found in Matthew S. Goldberg's, New Estimates of the Effect of Unemployment on Enlisted Attrition. Alexandria, VA: Center for Naval Analyses, ADA172661, 1985.

many is how the greater society regards military service. At the end of World War II, the idea of military service was one of an honorable duty to the nation, by the end of the Vietnam conflict such a glowing endorsement from the general public had greatly waned.

Our efforts to make military service more attractive and rewarding, however essential on their own merits, will be inadequate if they are not accompanied by public recognition that military service is a worthy career. The abusive defamation of the military that circulates in many quarters of our society is increasingly an obstacle to recruitment and retention of personnel by the armed forces. It is unjust, and it is dangerous to our security. If the military profession is not accorded the respect it deserves, no amount of money, no improvement in the conditions of service life, no recruitment campaign, will attract enough qualified volunteers to maintain an adequate military force. (DOD 1971, 135)

Early in this period the services relied upon the "20-year retirement possibility" as a key monetary incentive for retaining people on active duty, but this seemed to work best at retaining second- and third-term personnel instead of directly raising first-term enlisted rates. Lower than desired retention rates and the increase in complexity of military hardware in the mid-1950's led to a series of studies and measures trying to fix a rising skilled labor shortfall in the military. In early 1956, Congress commissioned then-General Electric president, Ralph J. Cordiner, to review the reasons for poor initial retention. The Cordiner Committee found that the military was quickly moving to reliance on sophisticated weapon systems, and this demanded more time to be spent in training, reducing actual on the job time.

Many of the recommendations of the Cordiner Committee (formally known as the Defense Advisory Committee on Professional and Technical Compensation) which reported out in 1957, became law in the Military Pay Act of 1958. This act concentrated on pay differences between military senior enlisted and officers and their civilian counterparts. It provided an average pay raise of fourteen percent, targeted to reach the

needs of senior enlisted and junior officers where the monetary gap was seen as being the largest. Specifically, with regard to compensation of enlisted, this committee reported that those at the end of their first enlistment could expect higher pay in the civilian world than if they remained in the military. (This pay differential between military and civilian pay rises and falls slightly in intensity, but even today the civilian-military pay gap continues.)⁴⁷ The committee was especially critical of the fact that in remote assignments military personnel often found themselves working next to civil servants who received significant bonuses for such assignments, while military members received none.

Junior officers were seen as a special problem because many entered the military through the Reserve Officer Training Corps (ROTC) program and served only their minimum required service. This group saw compulsory service looming and chose ROTC as the lesser of two evils. Many colleges had mandatory two-year ROTC programs for all fit males, and then a person could choose to have the final two years of tuition paid, in return for comparable minimum services as an officer rather than conscripted service in the enlisted ranks. (Officer Candidate School recruits were obligated for three years active service while enlisted draftees were required for two years of active service.)

Promotion was also a problem during the fifties. Those who had remained in the military after World War II were often those to whom accelerated promotions had been made available during war. These people were reaching retirement eligible age, and the military needed their retirements to occur so younger personnel could see openings in the

⁴⁷ In the 1977 study of Women and the Military by Binkin and Bach, their report shows statistics of a similar sized pay gap with the largest gap in the junior enlisted ranks (Page 32.) In the December 2, 2002 edition of "Navy Times" staff writer Rick Maze reports, "This is the fifth consecutive raise that includes targeted pay increases for some in addition to across-the board hikes for all. Pentagon officials believe this trend is likely to continue for at least several more years to raise pay of petty officers and non-commissioned officers to a level comparable with people in the private sector who have similar education and responsibilities." (Page 18.)

personnel structure that would allow advancement. Since the system was clogged at the top, qualified junior personnel left, and high replacement training costs and loss in operational effectiveness began to occur. When manpower shortages occur in operational units, those remaining sailors are required to fill the gaps. This means longer hours and longer deployments for those still serving. The result is when these personnel make their retention decisions, they are making it after having experienced the hardest of times. If they leave, more gaps occur and making it even harder on those remaining. The retention downward spiral commences, fewer people, more work, even fewer people, etc. Only with adequate numbers can the military then address quality issues in personnel. An attempt to deal with stagnation in the upper enlisted ranks also came out of the Cordiner Committee recommendations. The committee found severe promotion stagnation at the grade of E-7 and recommended the creation of the enlisted grades of E-8 and E-9.⁴⁸ An extremely important underlying reason for the creation of these ranks was to show young men and women serving their first-term that there was significant prestige in becoming a senior noncommissioned officer in terms of pay and position.

The military likes to be selective in the numbers of lower mental category personnel that it recruits. There were periods, however, when recruitment lagged and the pool of citizens ranking in the lower tenth to thirtieth percentile on standard tests⁴⁹ became too appealing to ignore. DOD had one formal program in the late 1960's referred to as "Operation 100,000"⁵⁰ which allowed the services to tap this population usually

⁴⁸ In the Navy, E-7 is Chief Petty Officer, E-8 is Senior Chief Petty Officer, and E-9 is Master Chief Petty Officer.

⁴⁹ Mental Category IV is further explained in Table 7 on page 137.

⁵⁰ The name came from an address by Secretary of Defense McNamara to the Veterans of Foreign Wars on 23 August 1966, (DOD Press Release 703-66) McNamara said that he was sure, "that at least 100,000 men a year who are currently being rejected for military service... can be accepted."

labeled "substandard." The idea was to spend extra time on these personnel by giving them more on-the-job training. Also, basic training manuals and repair manuals were redesigned to be appropriate for middle school rather than high school reading proficiency levels. In general, the services did not like this program, and upon the entry of Richard Nixon as President and the departure of Robert McNamara as Secretary of Defense, the program was abandoned. Although the idea was to emerge many more times during periods of recruiting shortfalls, senior military officers continued to hold that in some cases "no recruit" would be better than "any recruit."

Noteworthy Advancements, 1950-1970

Military service is difficult. There is a sacrifice in personal freedoms as conformity and discipline are required in numerous aspects of military life. Despite the military's recognition of the high cost of personnel movement, frequent moves and family separation are expected parts of a military career. In peace or war, the daily routine is hazardous, and those who work in the field of war-fighting understand its inherent risk. There are many ways to ameliorate the negatives of this service; they include sufficient pay, adequate education and training, and public appreciation; but certainly fairness in selection for service and training and promotion opportunity are also part of the solution.

Advancements were made during the 1950's and 1960's in pay and promotion opportunity and family living conditions, but perhaps most noteworthy was the social gains of increased participation that the military provided for women and minorities. Giant steps were made in accepting women into regular service and recognizing them as a viable resource for filling shortages left by inadequate male volunteers. In sheer numbers women played a small role in the manpower of the military in the 1950's to

1970's, with a peacetime roll of less than two percent and about one-third of all women serving in the health care specialties. Immediately, after World War II, the nation quickly tried to move away from its wartime posture and imposed legal restraints on women's service in the military. The Navy had been using nurses since 1907, and in 1942 women were allowed in several occupations in the Naval Reserve (e.g. WAVES - Women Accepted for Voluntary Emergency Service). Congress in 1948, passed the Women's Armed Services Integration Act (Public Law 80-625) which placed various restrictions on women's service in the armed forces. Specific restrictions on Navy women was contained in Title 10 U.S.C. section 6015 which originally read, "However, women may not be assigned to duty in aircraft that are engaged in combat missions, nor may they be assigned to duty on vessels of the Navy other than hospital ships and transports."

Traditionally, in peacetime, women in the military performed nursing or clerical duties; in fact, prior to the 1972 expansion, only 35 percent of all military enlisted job specialties were open to women. Following an initial reassessment in 1972, over 80 percent of the specialties were opened to women; and by 1976 they could be used in all but the combat-associated specialties. (Binkin and Bach 1977, 17)

Recruit shortages and "fairness" issues in the draft started discussions of women being used in combat ratings during the 1960's and 1970's, but it would not be until the 1990's that these combat restrictions for women would begin lifting. Proponents of restrictions, during this period, said that combat limitations revolved around "practical" issues. Although in most cases these issues do have a fundamental ethical consideration at their base, these "practical" issues themselves were not seen as or argued from an ethical principle. The surface statements against opening combat fields to women were sufficient for mainstream society to practice "if it ain't broke, don't fix it" reasoning. Typical status quo arguments of the period, against women in combat roles, could

include: 1) the occupation of warring is men's work; living conditions are too harsh for women to endure, 2) women are frail and our society has a standard of protection of women and children, 3) combat effectiveness will be weakened; diversity destroys the ability of a combat group to think as one; there is a need for male-bonding, 4) physically women are weaker, they will not be able to perform required tasks, 5) women's biological functioning of menstruation and pregnancy will periodically incapacitate them, so they will be unreliable to the unit. Closer to the truth was the simple belief that conscription would provide sufficient male resources, so women were not openly sought.

Obviously there are many military jobs that the average woman could do at least as effectively as the average man;...

First, in occupations in which women have traditionally been employed, there is little question that they can perform *at least* on a par with men. Included are a wide range of technical and administrative positions for which the principal requirements are general intelligence and academic ability, characteristics that women on average, are as likely to possess as men. (Ibid., 98, emphasis in original)

Women, despite their small numbers, proved competent contributors in the fields in which they were allowed to participate. Even if restricted in billet assignments to only non-combatant positions, progressively one after another many formerly male-only assignments were opened to these pioneers. In the end, it would be the high-quality performance of these women, serving in restricted areas, that became the major argument that combat positions could also be opened. It would take the movement to the All-Volunteer Force and the severe male shortages of the 1990's to finally push the issue of women into closed combat related jobs.

While the opening of restricted rates to minorities came much earlier, it would not arrive without its own angst. Despite Truman's Executive Order 9981 of 26 July 1948 prohibiting discrimination in the military, at the beginning of the 1950's there remained a

white male dominated hierarchy that used its dominant position to restrict women and minorities from competing for assignments in an unbiased manner. Gail Buckley spent fourteen years interviewing minority veterans of World War I and subsequent service, and in the introduction to her book American Patriots, she provides a concise and accurate picture of minority integration during this period of military history.

In 1948, President Harry Truman, a veteran of the First World War, integrated the armed forces by executive order, much to the displeasure of most of the military brass, including General Eisenhower. Truman's motives were partly humanitarian (he was appalled by the rampant lynching of black veterans in the postwar South) and partly political. Despite its presidential seal, the integration process was slow. Thus the Korean War, which began in June 1950 and ended in July 1953, opened as a segregated war....

Reflecting the thinking of many younger combat officers that military segregation was inefficient as well as unfair, President John F. Kennedy, a World War II Navy veteran, used executive orders to destroy the last traces of institutionalized military racism. His Committee on Equal Opportunity in the Armed Forces issued the revolutionary directive that military commanders must oppose discriminatory practices against military personnel both on and off base. It came just in time for Vietnam, the first war since the Revolution in which blacks and whites served together from the outset as equals under the American flag.

There were really two Vietnams. Those who were there in the early 1960s, products of Eisenhower social moderation as well as Kennedy social justice, were mostly volunteers and full of patriotic idealism....

By 1968, the war in Vietnam had changed, and the American soldier had, too. High morale and racial "sweetness and light" had been swept aside in a climate of political assassinations, civil rights martyrdoms, urban riots, and violent war protests. As the streets of America changed, so did the jungles of Vietnam, now infected by drugs, racial conflicts, and crimes like the massacre at My Lai. There was a new black GI: an angry draftee who was, above all, "black" - which, again, did not preclude heroism. (Buckley 2001, xx-xxi)

Despite the tumult associated in this integration period, progress was underway.

Minorities gained access to education and training in unprecedented numbers but not uniformly. By the end of 1970, Blacks were approximately 12 percent of men enlisting, but they were being accessed into the officer corps at a rate of less than two percent.⁵¹

⁵¹ Data obtained from Tables 10-11 and 10-12 on pages 220 and 221 of Richard V.L. Cooper's Military Manpower and the All-Volunteer Force (Cooper, 1977).

Although the military was reluctant to initially participate in this or any other "social experiment", important advances were made in the military and in the nation as a whole by enforcing the simple but powerful policy of equal treatment regardless of race, color, religion or national origin - (some effort of course still remains). An interesting part of this infusion of minorities into the full personnel system came as the military began to recognize that pressures on minorities off-the-job were greatly affecting their on-the-job performance. These "pressures" came in discriminatory practices found in the civilian community in housing and health care. Since military members were "assigned" to a base they had no easy choice if located in a civilian area that condoned discriminatory housing and health care practices. In the 1960's, the Department of Defense (DOD) made some attempts to encourage "voluntary" non-discriminatory practices by landlords and hospitals in communities near military bases, however, this was largely a failure. In 1968, Secretary of Defense Clark Clifford placed a ban on all military members renting housing from clients who had shown discriminatory practices against service personnel.⁵² In 1968, DOD began suspending the rights of hospitals to participate in its Civilian Health and Medical Program of the Uniformed Services (CHAMPUS) if racial discrimination were proven. These moves not only raised the morale of military members, who would now receive improved housing and health care, but also awakened the military personnel system that it could no longer depend on its old adage of "leave your personal problems at home." Navy personnel managers began to conclude that off-the-job influences of living areas, health care, day care, etc., were things that influenced all sailors, not just minorities. Personnel policies formerly considered as justified by tradition, from civilian

⁵² Details are revealed in a New York Times article, "Ban on Bias in Housing for G.I.'s Made Nationwide by Pentagon," of June 21, 1968, p. 24.

clothes privileges to base pay, began to become genuinely questioned for logical mission-related justification.⁵³

Movement to the All-Volunteer Force (1970-75)

Many debates in American society in the late 1960's revolved around issues brought into focus by our Vietnam participation. Not the least of these in volume was the "who serves in the military" debate. Those in favor of keeping the draft system argued that conscription was not contrary to democratic principles. If arguments were being made that previous drafts were inequitable, then draft reform was the solution, not some movement to an unknown, unpredictable volunteer solution. Other democracies seemed to be struggling with such a volunteer policy, especially in getting adequate volunteers in technical areas.⁵⁴

It must be remembered, proponents would argue, that the draft was required because there were traditionally not enough volunteers, even in times of peace. Those who desired to stay with the draft said that even if the pay differential was solved (by raising salaries of military members), military service would still appeal mainly to non-technical and non-professionals and thus make it extremely unlikely that our military would end up with the right mix of personnel.

Another belief of those against the AVF was that a large shortfall would appear in the reserves, as a large number of currently serving reservists were believed to be joining or staying in the reserves only to avoid full-time active duty, which the draft

⁵³ An example would be civilian clothes privileges on ships. Prior to 1970, sailors were required to wear uniforms to and from their ships, because civilian clothes were not allowed on ships, because ship lockers were too small to hold uniforms and civilian clothes. In 1971, this restriction was removed and from that point on new ships had bigger lockers. (Sailors on older ships found creative ways to store their civilian clothes.)

⁵⁴ One example of this is found in a U.S. News and World Report article, "British Troubles with a Volunteer Army," dated April 21, 1969, p.80.

could impose on them. Without a proper reserve pool, military manpower would never be able to serve in true emergencies. Opponents of the AVF wondered aloud if minorities living under the inequalities found in the national civilian system would not be driven to a volunteer military with increased pay, thus the burden of war-fighting would lay unevenly on a single segment of society. As proof of this possibility they pointed to the unequal occupational assignments of blacks during the Vietnam War. Blacks accounted for 12.5 percent of men killed in action between 1961 and 1970, which was higher than their percentage in the larger population (Moskos 1973a, 101-102.).

Those who favored the movement to the All-Volunteer Force argued that the draft constituted "an unfair tax" on draftees who would bear the economic burden of being paid less during service than they would earn if remaining in civilian life. Draftees also would simultaneously suffer productive loss caused by "career delay or interruption" while they served. In moral terms, proponents would argue that an AVF was more in line with the concept of a free society. Those in favor of the removal of the draft system argued that it had been the draft itself that caused this disproportionate burden on the poor and that its elimination would help solve this social inequity.

Third, a volunteer military is far less likely to exploit the poor than did past systems of conscription. Historically, draft systems have been heavily overrepresented (sic) by the poor. Chapter 4 showed that the 1918 draft boards were under explicit guidance to induct first those individuals with the least-valued civilian alternatives, namely, the poor. The methods of discriminating became more subtle with the introduction of peacetime conscription following World War II, through such devices as college deferments and draft-exempt jobs, but they were no less pervasive. (Cooper 1977, 205)

A third group during this time proposed some type of Universal Military Training (UMT) or National Service as an alternative to conscientious objectors. Those in favor of such service suggested that it would provide the manning that draft supporters desired

and yet minimize the "tax" by allowing individual choice to those who wanted to choose another national service corps instead of the military.⁵⁵ In 1968, the Department of Defense, Office of the Assistant Secretary of Defense for Manpower, initiated a major study of the problems of the draft and its alternatives.⁵⁶

A major campaign promise of Richard Nixon during 1968, was that he would try to establish an all-volunteer military after our withdrawal from Vietnam. When the new Secretary of Defense, Melvin Laird received the results of the previously mentioned study, he and a bi-partisan group in Congress introduced legislation calling for an end to the draft and the creation of a better paid All-Volunteer Force.⁵⁷ The key study was performed by a special 15 person advisory group under the leadership of former Secretary of Defense Thomas Gates. The commission was chartered in March of 1969 and reported out in February 1970. The ground was clearly established that eventually the draft would end upon Vietnam's conclusion, but at this same time the administration began to address "perceived problems" even before the conflict's end was in sight. On May 13, 1969, President Nixon addressed Congress with a six point proposal to correct draft issues until its eventual elimination.⁵⁸ A key change in the six points was that draftees would be selected through a random lottery system. In November of that year, Congress authorized the plan and the first lottery drawing was held in December 1969, as birth dates (e.g. 31 December, 14 April, etc.) were drawn in a nationally televised event. Those with birthdays on the first one-hundred dates drawn were expected to receive

⁵⁵ In 1968, these alternative included the Peace Corps, Volunteers In Service to America (VISTA) and the National Teacher's Corps.

⁵⁶ Reported on Page 1 of the New York Times on October 20, 1968, "Pentagon Orders a Study of All-Volunteer Force" by William Beecher.

⁵⁷ Reported on Page 1 of the New York Times on January 31, 1969, "Nixon Seeks Plan to Replace Draft with Volunteers".

⁵⁸ Reported on Page 2 of the New York Times on May 14, 1969, "Text of President's Message to Congress Proposing a Draft Lottery and a Reduction in Period of Eligibility".

induction physical notices by the end of Spring 1970, the bottom one-third could feel fully confident that no such notice would ever arrive. When the Gates Commission reported out,⁵⁹ it recommended the establishment of an all-volunteer military supported by a stand-by draft system. It recommended pay raises as the solution to recruitment and suggested ending conscription by 30 June 1971, when the law in existence was due to expire. In reality, the end occurred in December 1972, when monthly induction calls were stopped and the nation moved to fill military requirements with an All-Volunteer Force (AVF).

Enter Admiral Elmo R. Zumwalt Jr.

This chapter concentrates on manpower issues of the period 1950 to 2000. During these fifty years there were two leaders in the Navy who distinguished themselves as innovative in the world of personnel management. Admiral's Elmo R. Zumwalt Jr., and Jeremy Michael Boorda were exceptional naval officers, who greatly influenced Navy personnel policy, long after their years of actual service. This chapter covers Navy's manpower development in a chronological fashion, so these two Admirals will each have a segment of this chapter devoted to their significant contributions to Navy manpower.

From July 1970 until July 1974, Admiral Elmo R. Zumwalt Jr. served as the Chief of Naval Operations (CNO). Although Zumwalt warned of the growing Soviet naval presence worldwide, the U.S. Navy continued to be reduced during his tour as CNO. Morale was low in the service, and Zumwalt was under the opinion that personnel changes beyond fixing inequities in base pay were required. He understood that job satisfaction could be improved with non-monetary reforms. CNO Zumwalt sent out 121

⁵⁹ The official title of the report was, "Report of the President's Commission on an All-Volunteer Armed Force, February 1970" (President's Commission on an All-Volunteer Armed Force, 1970).

personnel directives during his tenure, that were officially labeled Z-NAVOPS but were immediately dubbed throughout the fleet as Z-Grams. In his own words Zumwalt describes his personnel objectives in these initiatives, these reforms were a significant part of how first-term reenlistments rose from a low of ten percent, when he came into office, to a high of nearly forty percent by the end of his tour.

The most significant event in the retention area is the payoff in the end FY statistics. This is one of those areas where there are no spectacular initiatives, but rather four years of hard work aimed pretty much at making what was there work. Retention cannot be separated from the incentives in the Human Goals area, and the overall human resource management thrust of the Z-grams. Specifically, there were a plethora of retention aid programs which were not doing the job because of a general lack of focus/support in the chain of command. Thus the thrust of the retention effort was to reinforce/revamp policy to:

- Make it clear that retention is a command, not a BuPers responsibility
- Stimulate command initiative and personal involvement in retention. This was determined to be the major factor affecting successful retention efforts.
- Increase effectiveness of internal communications to overcome lack of personnel and command awareness of programs, opportunities, and benefits available.
- Review policy/programs which could provide relief for first termers in critically manned ratings.
- Derive a means of determining retention effectiveness.
- Coordinate retention efforts with the Human Goals Plan. The two could not be divorced because leadership, management and command climate were proven directly to affect retention. (Zumwalt 1976, 271-2)

Initially Z-grams flowed furiously, with Z-grams numbers 1 to 92 being issued within the first year. None of these Z-grams covered issues considered vital by most other senior naval officers, but these issues seemed overwhelmingly vital to the serving young officers and enlisted persons. A sample of first year Z-gram topics shows; 02 established a retention study group; 04 guaranteed leave for permanent change of station orders; 05 allowed civilian clothes on ships; 13 guaranteed post-deployment leave; 16 granted the ability to arrange an exchange of duty with a sailor from another ship; 24 established

wives' ombudsman program; 34 included uniform changes; 57 eliminated abrasive regulations (formerly dubbed Mickey Mouse Regulations); 66 established equal opportunity in the Navy; 70 dealt with grooming and uniform policy; 77 established the enlisted blue working uniform; 88 discussed advance of pay.⁶⁰ The Naval Personnel Research and Development Laboratory in late 1971, issued a report that summarized a survey taken at the end of this first year of Z-grams. It found:

Eighty-Six percent of the enlisted men believed that "Z-Grams" have been good for the Navy. When questioned more directly, a majority of enlisted men reported that Navy life had improved in five out of eight areas. These areas were: regulations (79%), leave and liberty privileges (64%), personal services (59%), living and housing conditions (54%), and family services (52%). ...

Eighty five percent of the officers believed the "Z-Grams" have been good for the Navy. When questioned for more specific information, a majority of the officers reported that Navy life had improved in six out of eight areas. These were: leave and liberty privileges (74%), personal services (71%), regulations (67%), family services (58%), equal rights opportunities (57%), and retention programs (51%). (Wilcove 1971, iii-iv)

Further substantial issues were addressed, after this study, in the second year of Z-grams. In April 1972, Z-gram 109 "Recruiting is My Top Priority" was issued. In August of that year, Z-gram 115 "Alcoholism and Alcohol Abuse Among Naval Personnel," addressed the need to start a cultural change away from the drunken sailor image of the past. This was a follow-up to a July 1971 Z-gram (Z-94) that had begun to address drug issues in the Navy, and less than a week after 115, Zumwalt issued Z-gram 116, a public proclamation on "Equal Rights and Opportunities for Women in the Navy". Anticipating Congressional approval of a much wider equal opportunity law than was ultimately passed, Zumwalt immediately opened many positions in the Navy that had previously been closed. Zumwalt saw women's issues not only from a fairness position

⁶⁰ A complete list of Z-grams can be found in Appendix D of Zumwalt's memoirs, On Watch (Zumwalt, 1976).

but also he believed full employment of women would be necessary to meet future naval manpower needs. Zumwalt was the first top Navy leader to adopt business management practices of the day, to examine the sailor in a holistic manner and to determine that recruiting and retention decisions were not one-dimensional issues. Zumwalt's recognition of the importance of treating the whole-life issues of career sailors with sound management practices, including fair wages, was a major revelation in Navy manpower management. This period of leadership by Admiral Zumwalt set the stage for the Navy to invest some of its resources in personnel studies instead of just hardware. From the success of his initial top-down management actions, came the impetus to begin personnel studies on sailors needs and from those studies came their resultant model developments which form the basis of today's management system.

Navy Manpower Post-Vietnam

Stimulated in part by the obvious need to reconstitute and reorient the armed forces after the traumas of Vietnam, many officers have already begun to question long-standing policies and practices and to rethink U.S. military needs....(W)illingness to reconsider fundamental assumptions underlying both strategy and organization and to air for debate critical views on such normally sensitive topics as promotion policies, service parochialism, the place of women in the armed forces, the relevance of the service academies, the place of tactical nuclear weapons in American strategy, the rationale for the Triad, the utility of game theory models for strategy, the ways of minimizing possible military interventions overseas, and the political uses of military forces. Out of the processes of analysis and discussion such as this within the military ought to emerge the strategic concepts and policies, as well as the military leaders, necessary to adapt the U.S. military establishment to the changes taking place in American society and in the international environment. (Huntington 1973, 15-16)

Between the height of U.S. involvement in Vietnam and the mid-1970's the number of personnel serving in the military sharply declined to about 2.1 million from a

peak of 3.5 million.⁶¹ In October 1972, the United States signed a peace agreement with North Vietnam, but was unable to convince South Vietnam's President Thieu to sign it. In January 1973, a ceasefire was negotiated in its place, which both the North and South signed, and the American withdrawal from Vietnam began. Within two years the ceasefire collapsed and so did the entire South. The Vietnam conflict caused this nation to do a lot of soul searching on several military issues. One of the resulting major changes was the large drawdown in military forces demanded by the public after a very unpopular war. This reduction was hastily enacted by the release of thousands of draftees and the commitment of the government to an All-Volunteer Force. In the "FY 1972-76 Defense Budget", then Secretary of Defense Melvin R. Laird presented his military draw-down plan.

The planned reduction of active duty military personnel can be achieved largely through voluntary means. A substantial portion of that reduction will result from lower accessions. The remaining reductions can be achieved by permitting many officers and men to terminate their active duty service before their normal separation date. ...

There are other problems as well in moving toward zero draft calls. The personnel loss rate will be high as previous year draftees and draft-induced volunteers leave military service, many of them with high technical skill levels. Furthermore, there are problems in acquiring officers

The most serious obstacle to achieving zero draft is pay. Military pay is much too low, and is scandalously low for men in the entering enlisted grades with less than two years service. I want to bring to an end the injustice in the fact that thousands of our military families today are eligible for relief because of low pay. (Secretary of Defense 1971, 132-4)

A major problem with this type of force reduction (i.e. allowing volunteers to choose an early release) lies in the fact that the military system is a closed personnel system (as opposed to the civilian personnel system that in most sectors can be described

⁶¹ Numbers compiled from yearly Secretary of Defense's Annual Report to Congress. Subject numbers are rounded to nearest tenth of million by year as follows: 1964, 2.6 million; 1968, 3.5 million; 1970, 3.0 million; 1972 2.5 million; 1978 2.1 million.

as an open system). A closed system requires all personnel to come in at the bottom of the organizational structure and work their way up. An open system allows personnel to either start at the bottom, in the middle, or even at the top. An open system can entice personnel into the system to fill its vacancies, but a closed system must promote internally to fill its higher positions. When the military allowed personnel of all pay grades to leave the military, at the close of the Vietnam War, more than expected middle-force enlisted and officers left the service. Therefore, although the Navy met its total force size, some years of service (YOS) spots were left with shortages. The military had managed its personnel to reach a total number rather than wisely shaping the draw-down to meet the requirements of its organizational pyramid shape.

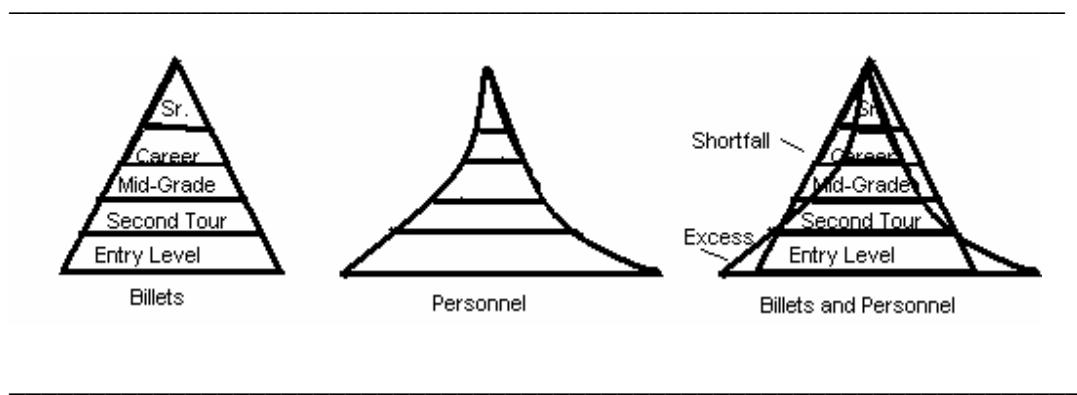
Annually the size of the Navy is determined by pricing out, people-wise, the necessary forces, the supporting elements and the training base, and then adjusting to meet fiscal and manpower constraints. These constraints are imposed by the Secretary of Defense as well as by the Navy itself by reason of pragmatism.

Having determined the general size of the Navy, the manpower requirements are refined in more detail by determining the qualitative requirement of each billet or space. Does this billet require an individual with electronic knowledge? Book-keeping skill? Or what? And to what level - beginner, master or in between? The summation of these individual requirements determines the total Navy manpower requirements, quantitatively and qualitatively, for the year in question. (Combs 1965, 211)

After the initial hemorrhage of departing personnel had slowed to a trickle the Navy finally assessed its resulting structure. Rightly displeased with the results, but contained in its closed system policies, little could be done and it would take a decade or more to effect reforms that would return the personnel pyramid to its desired shape. Billets had been downsized in a uniform manner leaving a billet structure that showed a hierachal pyramid shape, however the number of people could now only be brought up to total end strength requirements by recruiting at the bottom. A classic personnel to

billets mismatch occurred which would require, even in the best of circumstances, decades of management to repair. (Table Six displays a pictorial representation.)

Table 6. A Pictorial Representation of a Billet and Personnel Mismatch.



Note: Not to exact scale.

This poor management practice, in the post-Vietnam drawdown caused another problem between the military and its Congressional critics. The problem revolved around a higher than expected officer to enlisted ratio, and within the officer corps a higher ratio of senior officers to junior officers than had existed during World War II and Vietnam. This "brass creep"⁶² was partially rationalized by the Navy in claiming that during peacetime these senior people serve as the foundation for what will be needed in war where most of the input would be expected to come in lower pay grades. More truthful was the fact that most of this senior imbalance was caused by the military trying to hold on to anyone it could, to maintain end strength as the downsizing continued. Since the military must convince Congress each year of a desired total size, it is a commonly held belief of the manpower planners that if you cannot meet end strength, at the end of the

⁶² A derogatory term which implies too much senior leadership in a military organization. Along the lines of the saying, "Too many chiefs and not enough Indians."

fiscal year, at current strength levels it would lend credence to those who want to shrink the military and a lower end strength than desired would be imposed. So the goal was "total personnel" not a billet-to-person match.

Another of the problems that occurred from this shortage of mid-grade officers and enlisted was that personnel were sometimes assigned in billet positions a pay grade or two above their current actual grade, and therefore they lacked required experience. This was often a recipe for disaster, as the person was not prepared for the level of responsibility they were given. Women officers seemed especially susceptible to this practice during the 1970's. Because of critical shortages of males and the need to keep ships manned at a minimum level of 80%, newly commissioned women Ensigns (O-1) were assigned to ashore senior Lieutenant (O-3) positions and were expected to perform alongside those with six to eight years of service. When the women fell short of job expectations, because of their training not their capability, the entire gender was criticized as not being able to pull their weight.

Although the military did not adequately manage its required reduction in personnel at the end of Vietnam, it had no control over the upwelling of support in the nation to drop conscription and move to an All-Volunteer Force. The popularity of joining the military as an act of service to the nation had waned greatly. The military and its statisticians argued vehemently against the movement to disable the draft, with arguments emphasizing the shrinking pool of male manpower anticipated over the next two decades. When it became clear that the AVF was inevitable, the Navy unaccustomed to relying on market forces to attract and retain people, began to look toward corporations to answer key questions in personnel management and to issue leadership suggestions.

The answer is that much has been learned over the past ten or fifteen years in the field of human behavior

The purpose of this book is to explore various techniques through which a leader of a Navy organization may get his people to perform their jobs, and to examine which of these will result in the highest degree of utilization of the talents of the personnel in the organization towards achieving most effectively the accomplishment of the mission and the establishment and maintenance of the *esprit de corps* in the organization. (Zumwalt 1972, 2-3, emphasis in original)

Requirements Determination

New systems of management were attempted to try and make the Navy fit the successful business model. A revised U.S. Navy Regulations 1973 was issued, as one of many directives that began formalizing business-like management practices.⁶³ A new training management tool was established Navy-wide called, "Personnel Qualification Standards" (PQS), which standardized training formerly handled with "on- the-job" variations. Individual and unit training records were required in all organizations and these were inspected regularly. Even daily work schedules such as routine equipment maintenance fell under strict management regimes. "The 3-M System" (for Maintenance, Material, and Management) had a "Planned Maintenance System" for maintaining equipment readiness and gathering information that was fed back to maintenance depots that in turn made decisions on spare parts procurement Navy-wide.

The manpower requirement determination process was also challenged. Until that time ship and shore manning requirements were determined mainly by historical processes that determined how many people were required to perform essential functions.

⁶³ Article 0727 directed Commanding Officers (COs) to "afford an opportunity, with reasonable restrictions as to time and place, for personnel under his command to make request, reports, or statements to him, and shall insure that, they understand the procedures for making such requests, reports, or statements." This same article tell COs to, "insure that noteworthy performance of duty of personnel under his command receive timely and appropriate recognition, and that suitable notations are entered in the official records of the individuals."

Each organization had a "Watch, Quarter and Station Bill"⁶⁴ that assigned each person on the ship duties for special evolutions. People were assigned duty stations depending on the level of readiness required for current operations, with the requirement for battle conditions as the most demanding. Although there was plenty of maintenance work to be done by all, the actual total size of a ship's complement was determined by being able to fill all battle stations during conflict. Ashore positions were even less rigidly determined. The Navy had always accepted the fact a career sailor needed to alternate between sea and shore duty, this is known as their sea-shore rotation schedule. That is, several months will be served ashore and several months at sea. Tradition again seemed to say that a rotation of three years at sea, then three years on shore duty was best. This 36-36 rotation is usually goaled but not every occupation will meet this mark. During times of personnel shortages, in an occupational skill area, the amount of sea time will increase and shore time will decrease. While ashore, sailors were often not put into positions that had anything to do with their technical specialty. Although there was no doubt a baseline group of shore billets important for the Navy to fill, a number of these positions could have been filled by civilians, but were given to sailors to protect sea-shore rotation. This factor will become increasingly important as the total force structure is reviewed and numbers of active military are reduced in the future.

In the world of requirements, a new methodology of requirements determination began to take shape in this new quantitative world. The Ship and Squadron Manpower Document (SMD/SQMD) programs began to use industrial engineering and statistical techniques in determining the manpower required to achieve a specific level of

⁶⁴ In the U.S. Navy a list of personnel and their duties for a particular circumstance is called a "bill". An example would be an "Abandoned Ship Bill", which would tell every sailor which life boat to go to if ordered to abandon ship.

operational capability. For both ship and squadron manning there were considerations made for conditions of readiness, operational tempo and required missions. These were fairly straightforward in construction, as classes of ships basically performed the same functions, and ships and squadrons even with different missions had many similarities. It was not until the late 1970's, that a more formal process of requirements determination ashore came under such regimentation.

Shore establishment requirements determination began seriously in the late 1970's. The Shore Requirements, Standards, and Manpower Planning System (SHORESTAMPS) was developed as a model to determine manning requirements at shore stations for military and civilian personnel. SHORESTAMPS had a workload tasking subsystem (SHOROC -Shore Required Operational Capability) that was to determine how much work was required in a section of an activity. A staffing standard was then developed to apply qualitative and quantitative attributes to this workload to actually determine years of experience and skill-specialties needed to effectively do the jobs assigned. Once an entire shore station was examined in this manner, a Shore Manpower Document, was created which established total manning levels. Flexibility was allowed in moving personnel within the shore activity from job to job as long as end strength figures were respected. Staffs were evaluated on a procedure called Staffing Guides, which left manpower determination more in the hands of the staff commander than by following stricter time-motion analysis performed elsewhere.

Early Modeling in Personnel Issues

Since the mid-1960's, the field of operational research had begun to model personnel issues. At first there was some acceptance of low retention in first-term

enlistments, and studies were completed and models established that determined "the optimum proportions of formal and on-the-job training in those occupations where entry level training can be accomplished" (Bateman 1965, 184). Basic personnel management at this time was cost-benefit analysis that under this scheme treated information on people in the same manner as it treated basic material for a job. Models expected so many people, at such and such a time, and goaled reducing any duplication of effort, and quantitatively producing minimum-level personnel requirements. Figuring how to obtain the most production output with the least human input through a quantitative process was the guiding measure of effectiveness for each manpower project. By the mid-1970's manpower studies had expanded into productivity issues like youth versus experience, and the broadest areas of recruitment and retention. Studies in recruitment and retention searched for a quantifiable dissatisfaction trait that could be causing low enlistments and high attrition. Some economic variables emerged as likely candidates, pay comparability was studied and dissected while other economic issues such as civilian unemployment rates correlated well. Monetary issues were much easier to quantitatively model than were qualitative issues like job satisfaction, education opportunities or family separation. Would the nation be able to recruit and retain a peacetime force during healthy economic times and with a shrinking young male manpower pool? Although there could be innumerable ways to answer this question economic analyses became one that Congress was interested in hearing. Here is a telling quote from a 1977 Rand study:

Chapter 2 demonstrated that cost has become an increasingly important issue in defense manpower. Although economic considerations are not the only input to the ultimate policy decision, the resource and cost implications of the various policy options do play a central role. In other words, the choice of public policy (e.g. whether or not to end the draft) is influenced by the amount of

resources used by each policy alternative, so identifying these real resource costs is crucial if the proper policy choice is to be made. (Cooper 1977, 67)

Economic models of this early period predicted that an All-Volunteer Force could never meet peacetime requirements without increased pay, and either changes to its restricted use of low mental groups or a relaxation of the military's physical qualification standards. Even those few modelers who predicted that peacetime numbers of volunteers could be reached, expected over-representation of minorities and low income families as entrants. No study of this time predicted that any significant conflict could be undertaken by the United States military without an immediate return to conscription.

One key study in this period was headed by David S. C. Chu, who is presently serving as Under Secretary of Defense for Personnel and Readiness. His study team concluded that the military was disqualifying between 14 and 17 percent of volunteer applicants because of physical limitations. It suggested that after looking at the data perhaps up to 40 percent of those disqualified could in fact have been inducted without degrading service readiness.

If (as appears likely) only 570 out of every 1000 true volunteers can meet current service standards, and if 140 of the 430 failures are for medical reasons, then a 40 percent reduction in the physical disqualification rate means a gain of 56 enlistees in every 1000 applicants, or a 10 percent increase in enlistments ($56/570 = .10$). A gain of this size would close a quarter of the Army's projected shortfall in FY 1974 enlistments.... Moreover, this is a gain in volunteers able to meet current mental standards, thus helping to maintain a high level of mental qualification in the all-volunteer force. (Chu, Norrblom, Brown, and MacInnes 1974, v-vi)

Such reports often compared military enlistment standards to those of private corporations or other governmental agencies. For example in Chu's study in the category of maximum weight to height, military standards were compared to those civilian standards of companies such as Boeing, Lockheed, American Airlines, and merchant

marine standards. These kinds of comparison served subliminally to suggest that perhaps the military profession was just another occupation. Since the military's elite status, in the minds of the general public, had generally been reduced, comparing the physical requirements of the Department of Transportation for truck drivers in interstate commerce to those needed in the military's combat arms hardly raised an eyebrow.

Although the issue of women in the military was not addressed in Chu's study, his conclusion that the military could reduce physical standards helped open the path for future challenges of these physical standards, especially by advocates for increased female participation in the military. During the early 1970's, much was made of the fact that men as a group tested as faster, more enduring and more powerful than women as a group. However, as technology began to be incorporated into the Navy, both on ships and ashore, less and less physical labor was required. This was especially true in the non-combat areas open to females. In 1976, 10 U. S.C. Section 6015 opened all but 16 of the Navy's 99 enlisted ratings to women, but excluded women from certain shipboard assignments.

The Secretary of the Navy may prescribe the manner in which women officers appointed under section 5590 of this title, women warrant officers, and enlisted women members of the Regular Navy and the Regular Marine Corps shall be trained and qualified for military duty. The Secretary may prescribe the kind of military duty to which such women members may be assigned and the military authority which they may exercise. However, women may not be assigned to duty in aircraft that are engaged in combat missions nor may they be assigned to duty on vessels of the Navy other than hospital ships and transports. (10 U.S.C. 6015 of 1976)

The services have a standardized testing procedure that they will administer to anyone interested in the military service. Two standards are used to measure mental ability - performance on the armed forces entrance examination, called the ASVAB

(Armed Services Vocational Aptitude Battery), and high school graduation. Based upon results of the ASVAB test, personnel are placed in a mental category I through V, with Category I the highest and V the lowest.⁶⁵ In actuality, Category III is further divided by subcategories A and B⁶⁶, and Category IV contains subcategories A, B, and C.

Table 7. The Percentile Breakdown of Mental Categories of the Armed Services Vocational Attitude Battery

Category	Percentile	Category	Percentile
I	93-100	IV A	21-30
II	65-92	IV B	16-20
III A	50-64	IV C	10-15
III B	31-49	V	0-9

Source: Richard V. L. Cooper, *Military Manpower and the All-Volunteer Force* (Santa Monica, CA: RAND, R-1450-ARPA, 1977) 127, footnote 9.

The services resisted suggestions that taking more Category IV recruits was necessary as it moved to an All-Volunteer Force. By law it was restricted from taking Category V personnel, and Category IV non-high school graduates had statistically shown themselves in the past to be the least survivable and retainable of all categories. So the debate centered around whether the services should go after non high school graduates in Categories I, II or III before they sought Category IV high school graduates.

⁶⁵ See Table 7 on the following page for details.

⁶⁶ Cooper refers to level three categories as being subdivided into levels IIIA and IIIB (Cooper 1977, 127). Lockman refers to the levels as IIIU and IIIL with the U and L standing for upper and lower respectively (Lockman 1987, 115). This designation change appears to have occurred in 1980, after the test was re-standardized to equate to the distribution of scores of a nationally representative sample of American youth who were tested in that year. Percentile ranks were not affected by this designation change.

The services tended to voice acceptance of empirical data suggesting Category IV high school graduates as the proper choice, but in recruitment practices each service bureaucratically clung to Category I-III accessions as a preferred course. Part of this tactic was the belief by the services that holding down Category IV accessions would also help hold down the number of blacks accepted, because blacks in this period made up a disproportionately large share of the Category IV population (Cooper 1977, 211).

The 17-21 year old population of the nation nearly doubled between 1960 and 1980,⁶⁷ thus instead of the doomsday recruiting climate originally expected, as the military was shrinking the actual number of eligible males was still on the rise. Additionally, the economy was undoubtedly a major contributor to the AVF's initial success.

In some circles, the success of the AVF to date is largely attributed to a fortuitous confluence of factors that are unlikely to continue into the future, ... These "special factors" are the relatively high proportion of the male population in the 17-19 age group over the 1970s and the relatively high unemployment rate experienced by this group over the AVF period. (Secretary of Defense 1978, 291)

As the nation and the military reevaluated who they were during this period the overall result was surprisingly positive. In 1978, the Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics) published a status report entitled, "America's Volunteers: A Report on the All Volunteer Armed Forces", its summary of the start of the All-Volunteer Force (AVF) is captured below:

The active force was originally perceived as the most serious potential AVF problem. There were concerns that the active force might not be able to recruit enough young people, that the quality of accessions might drop sharply and that the force would not be as representative of the nation as the draft had been. The active force received the bulk of management attention. While not

⁶⁷ It had been estimated in early 1960 studies that the population of 17-21 year old males would peak at 10.8 million in 1978, and then decline to about 8.8 million by 1990 with a steady rate until 1995 and then another rise would occur (Cooper 1977, 189).

without problems, it is doing well today. Since the inception of the AVF, the actual strength has not been more than 1.5% below authorized levels.

The quality of active force is generally comparable with that of the draft era....

The mental quality of the force as measured by written test scores has tended to increase under the AVF....

Concerns that the active force would not be representative of the society at large have not yet materialized....

One major change in representations in the increase in blacks. Blacks comprise 16% of the active force in FY1977 compared to 9% in FY 1964. ...The blacks represent about 13% of the youth population.

Another representational change is women, who now constitute 6% of the active force. This is an increase from a level of 1% in the pre-Vietnam draft years. The women enlistees tend to improve the quality of the force, particularly in the Army and Marine Corps, with respect both to high school education and mental category. (Ibid., 181-2)

The pay changes initially introduced into the services in 1971, under the All-Volunteer Force, concentrated mainly on the first two years of service where initial military pay averaged about 40 percent below the median wages of comparably educated civilians.⁶⁸ Such pay changes of course raised the cost of personnel and increasingly models began to compare this or that manpower change recommendation to the bottom line in defense spending.

A few career management issues began to gain the attention of policy makers. The 20-year retirement system, which was instituted in 1948, had helped solve a lot of stagnation in career paths but some questioned its high projected costs. A second career assumption in the area of promotion policy also received attention from analysts, studies challenged the military's "up or out" promotion system which required continuing advancement to remain in the service. Studied was the issue of, "How many and of what quality are the personnel being forced out of the service by such a policy?" Navy

⁶⁸ Once an enlistee reached the four year mark pay greatly improved, based mainly on years-of-service adjustments more than advancements in rate, but was still, "between 5 and 20 percent below the earnings of their comparably aged and educated civilian counterparts" (Cooper 1977, 367).

managers responded to the studies with conscription-era thinking claiming that those who would be content with remaining in non-supervisory positions were those who would not be interested in retention, and therefore, "up or out" was really not an issue worth addressing. A third career issue, especially in the Navy became sea-shore rotation and "homeporting."⁶⁹ Sailors were expected to change jobs without question, and advancement would usually mean getting transferred to a different ship or station assignment. Officers and senior enlisted personnel were advised by their senior leadership that staying in one area (or homeport) was seen as putting personal needs above the needs of the Navy. Moving families across the nation and overseas was very expensive to the personnel system, but was rarely challenged by serving members. The forward deployed services, with numerous bases around the world, simply accepted high transfer costs as part of the cost of doing business. These transfer costs incurred not only the financial cost of moving personnel but actually require more personnel to be in the total system. For example, it might take one month to transfer from one command to another, the transferring person is not available to do work either at the losing or gaining command. With this one month as a metric you would actually have to have one extra person in the system to cover every twelve transfers, and in the Navy thousands of people are in the middle of a transfer on any given day.

Some perspective on the potential magnitude of these additional costs can be gained by noting that the Services planned on about 875,000 rotation moves during fiscal 1975, in addition to the more than 1.4 million moves resulting from accessions and losses. Even if the average time lost in each of these personnel

⁶⁹ Homeporting is a term derived from the fact that each ship, although free to move around the world's oceans is bureaucratically assigned a location as its main naval base. Families are moved to this location when a sailor is assigned to a ship. Thus even if a sailor changes ships, if the new ship held the same homeport the families could remain in the same geographical area. For married sailors this was seen as a plus. Many senior naval leaders and Navy manpower management saw this as a negative, believing that a sailor was more interested in staying in one location than taking challenging assignments in a variety of locations.

moves was only one month, the moves "cost" about 75,000 man-years, which, at the current average cost of military personnel, amounts to nearly \$1 billion in additional cost not shown in the budget. (Cooper 1977, 354)

Despite the supporting statistical data the Navy's manpower decision makers took no action on these issues (i.e. 20-year retirement, "up or out", sea-shore rotation and homeporting) at the time. Instead they concentrated on issues that were more easily quantifiable such as base pay and bonuses.

The Impending Disaster: Demographics versus Demand (1975-89)

Although high unemployment rates in the early 1970's had allowed the services to meet most manpower requirements during the post-Vietnam draw-down, like an impending thunderstorm on the horizon, the nation's demographics forewarned of a troubled recruitment and retention future. The Cooper report stated, "Between 1980 and 1993, the well publicized decline in the military-age males will occur, resulting in a 1990 population base the same size as the 1970 base. After 1993, the target population is estimated to increase again - a "second generation" result of the post-World War II baby boom" (Ibid., 189). The military's basic desire in the early 1970's was to merely meet end-strength, but as this was achieved, more and more studies and reports began to look at the characteristics of the new force. Studies concluded that it was not just acceptable for the military to meet required end-strength, the nation needed to care about who was being recruited. In a 1978 writing, Moskos sharply criticized the trend of the military to fill billets with any person.

The military has always recruited some youth, white and black, who had no real alternative job prospects. The recently advanced view that the armed forces ought to be an outlet for otherwise unemployed youth, while seemingly persuasive in the short term, is deceptive on several grounds. It fails to take into account the preponderance of minority and other disadvantaged youth in low-skill

enlisted jobs with which have marginal, if any, transferability to civilian employment. ...

(T)hose very conditions peculiar to the armed forces which can serve to resocialize poverty youth away from a deadend existence depend directly upon the military not being defined as a welfare agency, a definition that is hard to escape unless enlisted membership is representative of a cross-section of American youth. (Moskos 1978, 72-3)

During the late 1970's and early 1980's, the Soviet Navy began a formidable blue water expansion program.⁷⁰ In the 1950's and 1960's the Soviet Navy had many coastal patrol ships but were not able to take a naval fight elsewhere. This was partially due to the limited number of its warm-water ports and the basic Soviet mindset that as a continental power it was first and foremost concerned with its Army. At the height of the Vietnam conflict, the U.S. Navy had reached 947 ships and over 7,000 aircraft, but by mid-1978 it had shrunk to 468 ships and less than 5,000 aircraft. While the Soviet Navy had begun to develop into a significant blue-water challenge by 1978, the U.S. Navy was experiencing some key manpower problems. Recruiting fell 5,000 short of its goal in 1977, career enlistments were low and there were critical shortages of physicians, nuclear power officers and pilots (Chief of Naval Operations 1978, 5). Counting ships is not the best way to determine superiority at sea, however, it was growing clear that the continued downsizing of the U.S. Navy was leaving it precariously close to losing its top ranking in the world. The election of Ronald Reagan as President and his appointment of John F. Lehman Jr., as Secretary of the Navy quickly reversed these downward trends. The Navy set its sights on modernization and a fleet of 600 ships, including expanding its number of active aircraft carriers from twelve to fifteen. Along with this increase of hardware, came an expansion in manpower studies on the issues of recruitment, retention, training and

⁷⁰ "In 1962, the U.S. Navy had almost twice the combat tonnage of the Soviet Navy and its fleet included 875 surface ships. Twenty years later, by virtue of Soviet construction and American decline the two navies were more or less equal in tonnage terms (Ranft and Till 1989, 239).

billet requirements. Naval enlargement plans revolved around the Navy's ability to engage the Soviets on multiple fronts with forward deployed units. Reagan was the first President to face the Soviets and declare a military strategy that relied on more than deterrence. If deterrence failed, the new U.S. strategy expected the military to fight and win a conventional war.

This strategy, thus, has two dimensions. First, we must have a capability rapidly to deploy enough force to hold key positions, and we must be able to interdict and blunt a Soviet attack. It is the purpose of this capability to convince enemy planners that they cannot count on seizing control of a vital area before our forces are in place, and that they cannot therefore confront us with an accomplished fact which would deter our intervention. Second, this strategy recognizes that we have options for fighting on other fronts and for building up allied strength that would lead to consequences unacceptable to the Soviet Union. (Secretary of Defense 1982, 14)

Reagan was able to use the Soviet threat to institute key economic changes and reverse the military draw-down that had followed the Vietnam conflict.

During his first administration, Reagan put military Keynesian economics to work in two interrelated ways. First, when the severe recession of 1982 set in, a heavy influx of military spending and investment bolstered the economy. Second, once military-related production created some of the few bright spots in an otherwise dismal economic picture, the administration used that fact to gain support for further increases in military spending.

The FY 1982 budget produced 12 percent real growth in military budget authority and an 8.1 percent real increase in military outlays, or actual spending, for that year. This capital infusion boosted certain industries in troubled times; military spending accounted in particular for the overwhelming portion of durable goods orders during the recession. (Wirls 1992, 47)

This military revival was not without its problems. Democratic Senator Gray Hart and Republican Representative G. William Whitehurst, concerned about this tremendous expenditure on defense, formed and then quickly built up a watch-group of over fifty Representatives and Senators, in a bipartisan organization called the Congressional Military Reform Caucus (MRC) in 1981. Although the MRC was interested in many

subjects having to do with defense, from nuclear weapons to specific armament systems, they were able to make their biggest advances by exposing the mismanagement of spare parts in the military.

The growing military reform coalition discovered that the smallest details of procurement - the costs of individual weapons components and spare parts - carried the potential for powerful publicity. As several leaders in the movement stated, most citizens are not sure what a tank or bomber should cost, but they do know that a toilet seat should not cost \$700 nor a claw hammer \$435. (Ibid., 97)

By the time Reagan was leaving office it was clear to policy makers that the national debt would demand belt tightening in all sectors including defense. The shine of military expansion had been dulled by some financial mismanagement in DOD. Although the 600 ship number was not directly challenged, the Navy budget needed to support it was. In December of 1988, Secretary of Defense Carlucci submitted to Congress a list of eighty-six bases to be closed and fifty-four to be realigned. When President George Bush's, Secretary of Defense Dick Cheney took office an immediate defense reduction was implemented. Ships were retired early and the Navy's dream of a fifteenth carrier was scraped. Soon to follow, the world would witness radical changes in Eastern European governments and the dissolution of the Soviet Union, this collapse of threat upon which the U.S. military had been built to contain, would compel the Department of Defense to develop a new strategy that included providing the nation with a "peace dividend".

Manpower Expansion During the Buildup

The Center for Naval Analyses (CNA), introduced in the previous chapter, is a major research group sponsored by the Navy as a not-for-profit federally funded research and development center. The center was particularly active during the buildup period

publishing papers on manpower, personnel and training issues. A study by CNA during this expansion revealed the following:

The supply of male high-school graduate enlistments to the Navy and the other military services was examined using annual data from 1975 to 1980 on enlistment contracts in forty-three Navy recruiting districts.⁷¹ The effects on enlistments of military pay, GI Bill benefits, recruiters, advertising (for the Navy only), population, unemployment, Department of Labor training programs, and Department of Education student-aid programs were estimated. All but the last of these factors had significant effects on enlistment contracts, which helped explain the serious recruiting problems encountered during FYs 1978 and 1979.

To achieve enlisted manpower goals, the relative costs of enlistments and reenlistments were compared.⁷² Recruiting, training, and reenlistment-bonus costs were calculated for recruits with four-year enlistments in twenty-eight groups of Navy ratings. A computer simulation model was designed to minimize the sum of these costs while meeting manpower requirements at the point of career entry, the fifth year of service. As a result, continued strong support of the Selective Reenlistment Bonus (SRB) program, additional funding, and relief from the bonus ceiling was recommended to the Navy, particularly for technical ratings with high replacement costs. On average, each SRB dollar saved two and a half dollars in recruiting and training costs to achieve the then-current inventory of reenlistees at the point of career entry. (Lockman 1987, 43)

During the growth years, the force struggled with initial accessions but did much better in most retention areas and thus the force matured. This increase in the percentage of personnel with greater than 5 years of service, although working toward filling mid-level gaps in personnel, put pressure on the Navy's budget. While military pay raises in the early 1970's had concentrated on the enticement of new recruits, other changes such as targeted pay raises, high civilian unemployment rates, and a return to society's more favorable attitude toward military service in the late 1970's and early 1980's contributed significantly to retention. In the expanding system, promotions were rarely constrained, especially in the mid-grades that were still looking to fill shortfalls caused by the post-

⁷¹ Lockman cites Goldberg, Matthew S. *Enlistment Supply: Past, Present, Future*. Alexandria, VA: Center for Naval Analyses, CNS 1168, 1982, no page reported.

⁷² Lockman cites, Deborah G. Clay-Mendez et al., *Balancing Accession and Retention*. Alexandria, VA: Center for Naval Analyses, Study 1176, September 1982, no page reported.

Vietnam draw-down. The early 1980's were a time of increasing strength, but by the mid-1980's the services were facing budget pressure to control overall personnel costs. These financial restrictions in personnel first began as end strength controls, but soon other areas of personnel spending were under attack. In 1986, the services adopted a less costly retirement system that took effect for all personnel who entered after 1 August.

In the Navy, mid-grade officers and petty officers still faced shortages, and in specific areas certain management tools were enacted to guard this high value personnel pool. Ships, squadrons and operational staffs were manned at 100 percent, but shore stations were more likely to be manned at the 80 to 85 percent levels. Much statistical analysis and model development examined fair-share allocation and distribution processes. Traditionally personnel were moved according to an interaction between individuals and their detailers.⁷³ Sailors were told of the triad of detailing, specifically: 1) needs of the individual, 2) needs of their career and 3) needs of the Navy. Certainly, the needs of the service would be expected to be weighted most heavily in assignment decisions made by the Navy and individuals usually reported these "needs of the Navy" seemed to be the biggest side of the triangle. New manpower models created to "assist" the distribution system began to emerge. Examples in the officer world included "Officer Distributable PROjection (ODPROJ)," the "Navy Manning Plan for Officers (NMPO)," the "Officer Management Information System (OMIS)," which were all subsystems of the inevitable master plan the Officer Distribution Management System (ODMS). In the enlisted world, there were models such as FAST (Force Analysis Simulation Technique) to determine enlisted inventory in the future so that recruiting goals could be determined.

⁷³ In the Navy, the person located at the central personnel management office who represents the Navy in issues of change a sailor's duty station, extensions of service or tour lengths, etc., is called a detailer.

SKIPPER (SKILL Personnel Projection for Enlisted Rotation) made projections of personnel by length of service and gender within each community. The Sea/Shore Rotation Model System (SSRM) was designed to balance personnel inventory by occupation and sea-shore authorizations in order to provide fair distribution. CEDAD, the Computer Enhanced Detailing And Distribution model assisted detailers by finding all vacant jobs for which an individual was qualified. There appeared to be no area that was not able to be evaluated and predicted by some statistical model.

In 1981 as a Master's thesis, as partial fulfillment of a degree from the Naval Postgraduate School, the author contributed to this model explosion through thesis work on such a model. The model was an interactive model designed to show Surface Warfare Officer (SWO) requirements based upon the number of ships projected to be in service in the Navy and was labeled SWOTOURS.⁷⁴ Billet requirements were compared to inventory numbers derived by aging the work force with historical continuation rates. The model was used extensively in the 1980's to monitor Surface Warfare Officer continuation and retention rates. Officer recruiters were provided recruitment goals based upon expectations of how many Surface Warfare Officers would be leaving active duty, thereby creating vacancies in the system. The dependency of such models on continuation rates, to determine model predictions of losses, was not clearly understood by high-level decision makers. More and more models began to make predictions that managers failed to challenge, and more and more the goal seemed to be to remove human intervention from the system. Models which were manageable in the early 1980's,

⁷⁴ SWOTOURS is a partial acronym. SWO comes from the first letters of Surface Warfare Officers, who are naval officers whose warfare expertise is in the area of ships, vice aviators who work with aircraft or submariners who are best versed in the underwater world of submarines. The word "tour" is a military term for an assignment.

because they dealt with specific details of one issue and could be subjected to reasonable sensitivity analysis, became subsystems of larger and larger models that no one could be expected to understand or challenge.

Overall throughout this period of expansion, manpower analysts continued to advise the military and DOD civilian leaders that a 600 ship Navy could be manned with qualified people, if targeted resources were applied. Compensation was declared as the answer. Although models included some qualitative factors, many relied on economic factors such as minimum wage, and unemployment rates to determine continuation rates. Pay was the easiest and most understandable variable to manipulate when senior managers asked "what if" questions. Focus in Navy manpower briefs was on mission-critical occupations and those with out-of-balance sea-shore rotations. Sometimes labeled sea-intensive ratings, these were jobs mainly of technical nature in combat systems and engineering areas for enlisted personnel, nuclear-power for both enlisted and officers, and also some specific aviation officer shortages.⁷⁵ There was continued interest in accessing non-prior service (NPS) high school graduate (HSG) males, but the opening of women into most occupations and specifically in aviation had greatly relieved many initial accession issues.

As the 1980's came to a close, even before the dissolution of the Soviet Union and the resultant changes in military requirements, analysts began designing options of how manpower cuts should be handled in the future.

Manpower, personnel, and training programs will probably be subject to budget cuts, which would surely affect the manning of the future Navy.

⁷⁵ In aviation the major shortfall was pilots, but naval flight officers (NFO) who were the navigators and weapons releasers in many combat aircraft were usually covered in any bonus plans. The general argument was that if you were going to give the pilots a bonus, you had to give one to the NFO who flew in the same plane.

Unacceptable manpower policies under budget cuts include lowering recruit quality in order to meet end-strength, and tying (sic) up ships or manning them with skeleton crews. Lower-quality recruits result in higher personnel turbulence - premature attrition, disciplinary problems, wasted training, decreased experience, and administrative and supervisory burdens. Likewise with ships that do not operate properly or at all, because missions and tasks cannot be fulfilled and readiness cannot be maintained.

Viable options... include: offsetting limited pay raises with higher enlistment and reenlistment bonuses targeted on mission-critical and sea-intensive ratings, shifting the mix of deployable ships toward the Naval Reserve and civilian/contractor manning, and lengthening average sea tours while raising sea pay to reduce the demand for active-duty personnel in shore-rotation billets. These options could save the Navy substantial sums, and they have been used successfully in the past. (Lockman 1987, 92)

Just as economic issues had overwhelmed manpower policy in its growth phase, it appeared to many modelers that pay was the best solution if a draw-down should occur. Even though quality of life issues had been surveyed, and in some sense quantified, they had never received the attention of the modelers in a manner that allowed comparison to compensation, and now changes in the post-Cold War world delayed any urgency to do so. What occurred, like most things in life, is not what planners had really expected, the collapse of the threat came so quickly, and the demand of America's to disarm was so clear that in the end a fair-share reduction was quickly enacted.

Cold War Ends Dropping Overall Manpower Demands 1989-2000

Francis Fukuyama first argued in 1989 that, with the end of the Cold War, specific nations and regions may have reached the end of history. Liberal Western democracy was bound to replace all other forms of government as democratic governments and market-oriented economies would become the only viable option for a modern society to flourish.

What we may be witnessing is not just the end of the Cold War, or the passing of a particular period of postwar history, but the end of history as such:

that is, the end point of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government. (Fukuyama 1989, 4.)

It could hardly be a surprise with such expectations that immediately calls came to the services to provide a "peace dividend" in lower budgets, less hardware, and of course a reduction in serving personnel. In 1993, Secretary of Defense Les Aspin released "The Report on the Bottom-Up Review (BUR)" which presented force options and introduced the idea of a major regional conflict (MRC). A MRC capability became the rubric of military force levels during the remaining twentieth century. In the world of the Navy, the BUR recommended 346 ships and 11 active and 1 reserve aircraft carriers. This was a significant decline from the Navy's 1991 posture of 528 ships and 14 carriers. As previously identified, Navy manpower requirements determination starts with the manning of operational ships and aircraft squadrons, so a downsizing in ships immediately resulted in requirements and manpower reductions. Hoping to avoid repeating some major management mistakes made in its post-Vietnam downsizing, DOD decided it would selectively determine personnel it would "let go," instead of allowing anyone who wanted to leave the service. To do this it initiated several management programs.

Voluntary Separation Initiatives (VSI) and Special Separation Benefit (SSB) Programs. DOD ended FY 1992 with an active-duty military end-strength some 17 percent, or 366,000 below the peak end-strength of 2,174,000 in FY 1987. We must still draw down by approximately 400,000 more people, to 1.4 million by FY 1999. Until now, most of the reductions have been achieved by attrition, reduced accessions and our very successful voluntary separation programs. More than 22,000 service members have already applied for separation under the VSI and SSB programs this year; this is more than half of our FY 1993 goal of 30,000. We will continue to use these programs wherever possible to achieve further necessary personnel reductions. (Secretary of Defense 1993, 82.)

In order to manage its senior officer structure of Commanders and Captains (O-5's and O-6's) the Navy commenced "Continuation Boards" that examined officers in fail of select (FOS) status in these grades, and if "selected" the officer would be terminated within a few months. As an option, officers in this FOS category could submit letters of resignation, picking a time of up to twenty-four months from time of submission stating when they wanted to retire. Picking their time to retire allowed these officers planning time for them to transition to civilian life, and allowed the Navy to reduce its size in a controlled manner. Since the usual procedure was to accept resignation letters only six months in advance, many officers in these pay grades chose to voluntarily separate rather than being "selected out". With each voluntary resignation the Navy was able to reduce the number of officers that its "Continuation Boards" had to "select out." This was a most unpleasant process, and those who opted to take their chance but were "selected" for forced retirement, were most vocal in their displeasure of this system. The unintended consequence in the Navy was that this process just added more fuel to the fire of discontent among junior officers. Many mid-grade, and most junior officers, who were under the new retirement plan genuinely believed they had been cheated out of the old twenty-year retirement system. Now they were seeing their mentors "thrown out" at the first opportunity upon reaching fail of select status. Job security, believed by most manpower managers as a staple in the recruiting and retention plans of the 1980's, had vaporized in many sailors minds during the 1990's draw-down. Corporations downsizing during the economic down turn of the early 21st century have confirmed that "loyalty" is impacted by such restructuring efforts.

In a quest for the most productive companies in the world, Jason W. Jennings, a consultant and author of a recent book on the subject, settled on 10 businesses that had never made a layoff.

"Not only have they never had a layoff," Mr. Jennings said, "but each of them has a written or well-understood covenant with the workers that the corporate checkbook, or management missteps and misdeeds, are never going to be balanced on the backs of the workers."

Mr. Jennings, who chose the companies using a combination of elementary financial criteria and on-site research, conceded that he could not prove that a no-layoffs policy led to profits and growth for the group. But he did see something valuable in the strategy of the 10 companies, which included innovators like **Nucor Steel**, the minimill operator, and **Ryanair**, the low-cost European airline.

"They know that if they use layoffs," he said, "they're going to end up with a work force that's going to be more concerned about themselves than about increasing productivity," he said. (emphasis in original)⁷⁶

By the time of the release of the "Report of the Quadrennial Defense Review May 1997," it was clear that the U.S. military was the dominant military force in the world. As such, and combined with the growing cost of hardware systems and personnel, the number of ships and personnel continued downward. Current plans will lower the Navy to below 300 ships - roughly half the number it had achieved during the 1980's build-up. Having already mentioned that simply counting ships is a flawed metric for computing naval power, the Navy currently claims that an examination of capabilities to be the best measurement. Then-Secretary of the Navy, Gordon England, while taking questions after a presentation at the Naval War College in Newport, RI on June 11, 2002, said that due to tremendous advances in technology over the last 20 years that he believed, the 300 ships currently in the Navy to be far more potent than Reagan's nearly 600 ship force.⁷⁷

A positive note of the current down-sizing period is that most restrictions on women serving in the military have been lifted. Although some ships had been opened

⁷⁶ Quoted from a New York Times article of 26 December 2002, page C1, "Downsizing Could Have a Downside" by Daniel Altman.

⁷⁷ Copy of audiotape obtained from Naval War College Library.

for duty to women as early as 1978, it was not until 1991, that women were allowed to fly in combat aircraft in both the U.S. Air Force and Navy. In 1994, Congress authorized the lifting of the ban on women on combatant ships. Today Navy women are still restricted from duty on submarines and as members of the Navy's elite SEAL's (i.e. SEa, Air, Land) special operations teams, but have access equally in all other areas. Some questions still intrigue manpower planners in the area of women serving as a fully integral part of the Navy, and research still continues on issues such as productivity losses due to pregnancies, but these remain outside the scope of this study. Overall, the active military continues to be a champion of women in integration issues.

The Putting People-First Leadership Period and Admiral Jeremy Michael Boorda

The considerable contribution of Admiral Elmo R. Zumwalt Jr., to Navy personnel management during his tenure as Chief of Naval Operations (CNO) from July 1970 to July 1974, was previously noted. The other CNO showing inspirational manpower leadership in the second half of the twentieth century was Admiral Jeremy Michael Boorda, who served as CNO from April 23, 1994 until his death on May 16, 1996. Admiral Boorda joined the Navy, as an enlisted person without a high school diploma, in 1956. He was selected for commissioning in 1962 under the Integration Program, and was commissioned in August 1962 after completing Officer Candidate School. His first manpower tour came in 1983 where he served as Executive Assistant to the Chief of Naval Personnel and from August 1988 to November 1991 as Chief of Naval Personnel. Upon his selection to CNO, he immediately challenged the system to rise to new levels of excellence when it came to taking care of its people.

Admiral Boorda was the first former Seaman Recruit⁷⁸ to become the Chief of Naval Operations, and was known throughout the fleet as a sailor's sailor. His tremendous influence at all levels came from a simple saying that he repeated over and over as he dealt with daily issues in the world of manpower, "Do the right thing." Senior enlisted and junior officers felt empowered by this simple concept. They believed that they would be supported in their day-to-day decisions just by following this basic guidelines. Each leader had the freedom to be a people-first leader. A Navy man who at every stage of his career put the interest of sailors and their families first, Admiral Boorda convinced Navy leadership and each sailor that no ship, no squadron, no shore station, was better than the people who served in it. He knew that the Navy could not achieve its best without having well-trained people with good morale, and he stressed that although rules were good, there was nothing wrong with making an exception to the rules when it was required to meet true human needs. Treating each sailor as an individual with unique needs was his hallmark. Admiral Boorda, like Admiral Zumwalt before him, was living proof that even in a military organization of hundreds of thousands of people - putting individual needs first was not only possible but is extremely productive.

One of Admiral Boorda's lasting contributions was to open up assignments for women to serve on combat vessels, but sailors of his time remember that he just made them know that each sailor was important. He diligently worked his way to the top position in the Navy by consistently putting people first. As one quick example here is a news reporter's view of Admiral Boorda addressing 2,000 sailors at a Navy base in Norfolk, VA on October 21, 1994.

⁷⁸ Seaman Recruit (E-1) is the lowest enlisted pay grade in the Navy.

But at one point on this afternoon, that laughter dies away. Frank Salabarria, a chief machinist's mate, is at the floor microphone. He has a problem.

"Good afternoon, Admiral," Salabarria begins, knees shaking. "Less than a year ago I was forced to take my ten- and two-year-old daughters from Guantanamo Bay to spend three months watching my wife slowly, brutally die of cervical cancer. She was a chief petty officer. Between us we dedicated nearly 30 years to our country and our Navy."

"In June I'll have 15 years' service and could exit for early retirement. The problem is that my enlistment expires before then, in January. But I've been told if I re-enlist, I'm slated for sea duty, which will take me away from my children."

"You want to retire next June?" asks Boorda.

"Yes sir," says Salabarria.

"Your request is approved," says Boorda. "We'll work it out."

Salabarria's legs buckle. He doesn't hear the thunderclap of applause, or see his shipmates' tears.

Onstage, Boorda stops the applause. Any of the naval leaders present would have done the same thing, he says. Sailors begin to murmur, then laugh. They know better.

Some will say, Boorda tells them, that he broke a rule today. He disagrees. "If a sailor loves his children and loses his wife, we ought to treat him specially. And that's what we're going to do."

The applause rises again. Mike Boorda has saved another sailor - just as the Navy once saved him. (Philpott 1995, 119)

Simply doing the right thing one person at a time was the way Admiral Boorda approached the most important leadership job in the Navy. He understood the necessity of leading a large organization while accommodating essential individual needs. Unfortunately some follow-on leaders to Admirals Zumwalt and Boorda, while expressing the theme of people as the most important asset of the Navy, have in fact failed to keep the people-first theme of this period. They have not devoted required personal attention to manpower issues, allowing the Navy model-driven personnel management system to impose its people-last demands - that sailors conform to modeling predictions. As addressed in other parts of this study, it is possible for Navy leadership to break the bonds of tradition and to focus directly on the needs of sailors and to make the necessary management decisions to move forward. This type of leadership will require

risks by those currently serving, but the long-term rewards to the Navy will far outweigh possible the short-term disruptions.

The 1990's and Manpower De-emphasis

As noted in Chapter Two, a major result of the peace dividend appears to be a sharp reduction in new manpower models and studies. The Congressional Budget Office in a September 2000 report approached military pay and recruitment almost as a clear cause-effect relationship, providing proper compensation seems to be all that is needed.

The military competes with the private sector for its personnel. To keep the quality and quantity of today's forces in a steady state, their compensation must remain competitive with compensation in the private sector, which generally rises each year at a rate above inflation.⁷⁹ So a sustaining budget for military personnel must increase each year. (CBO 2000, www)⁸⁰

Could it be that the Congressional Budget Office (CBO) believes that "enough" models are in place and that they are performing so well that these formerly stressed issues of who serves and at what cost may be settled? Some research continues in the field of manpower but most seems to focus around changes in the military pay system as the only required solution to any remaining problems (such as wavering quality).

Despite the increase in education levels among enlisted personnel, there is reason to believe that the military is becoming less able to compete with civilian opportunities. Not only have college enrollment rates been rising, but the quality of recruits has been declining since 1992. In 1992, recruit quality reached an all-time high: 74 percent of non-prior-service recruits were high school graduates who scored in the upper half of the AFQT test score distribution. In 2000, 57 percent of recruits met these criteria. It should be emphasized that the quality of these recruits is no different from that of the 1987 recruit cohort, and 57 percent is certainly well above the 1979-1981 level of 30 to 35 percent. The concern is that recruit quality might continue to decline. (Asch, Hosek and Warner 2001, vi.)

After stating the problem these authors then presents their solutions:

⁷⁹ CBO footnote here reads: "One measure of the "quality" of military forces is the percentage of high school graduates among the services' recruits."

⁸⁰ Section 4 of 5, page 3 of 14 in that section.

As the FY 00 pay actions are phased in over the next five years, they should improve overall retention in all services and offset the declines experienced since the early 1990s. However, shortages may persist in critical occupation areas.

The FY 00 legislation raised pay and addressed technical anomalies within the pay table. But it did not address the structural changes in the civilian labor market opportunities available to the type of individual the military will continue to seek to recruit and retain in its enlisted force, namely high-aptitude high school graduates who seek or who have a college education. (*Ibid.*, ix.)

At the start of the 21st century, it is no longer a question of whether the military can recruit and retain sufficient numbers of personnel to join the All-Volunteer Force by dealing solely with pay, (if recruiting "anyone" is sufficient and high attrition and low first-term enlistments are acceptable). However, the nation could rightly question, "Is this current method of pay the best possible and will it obtain and retain the right persons or just enough bodies?" Adding an ethical aspect to this issue, even if you could exactly identify these right people, recruiting them and retaining them with excessive compensation, while depriving them of proper quality-of-life rewards, (such as failure to feel personal rewards from doing a meaningful job, minimizing educational opportunities and ignoring professional stature), would be the wrong choice. Overpayment in any segment of the national budget reduces the nation's limited budgetary resources to be able to handle needs in its other segments. More importantly, having personnel with low job satisfaction produces a less effective military force.

This chapter examined the historic issues in Navy manpower of the last few decades. During this time the nation turned away from conscription to an All-Volunteer Force. This study raises the question, "Has the Navy failed to properly recognize that this revolution in military affairs requires new organizational approaches in Navy manpower recruiting and allocation strategies?" In the 1960's and 1970's, the Navy adapted the

civilian management tools of quantitative analysis and operational research. But during the 1980's and 1990's, the Navy made far less progress in adopting progressive corporation management practices in the area of understanding the whole person and their workplace. Navy leadership understands that the high-tech sailor of today is not the low-skilled worker of the past, but they have not dissected the current complex Navy models to understand their underlying economic assumptions. If high-tech sailors will react to enlistment and retentions incentives in the same manner as the labor intensive worker that the models were designed to originally influence, then revisions to the models are not as critical. This question remains, however, "Can the new high-tech sailor can be recruited and retained with the same personnel system that was designed for labor-intense workers whose main incentive was base pay?" This chapter dealt with the history of how management practices evolved, while the next chapter examines the subjects of Navy manpower modeling and begins to look for characteristic differences between high-tech and labor intensive workers.

CHAPTER FOUR

MANPOWER MODELING AND PERSONNEL CHARACTERISTICS

Labor Economics and Requirements Determination

In the business world, labor economics is the study of how the input of human labor affects the total profit model. Economic models are used by businesses to determine effectiveness and efficiency issues. The science of labor economics was designed to examine the areas of wages, employee hours and total workforce. By using supply and demand curves, businesses seek to find optimal points of labor use, while maintaining focus on their overall business goal, which is to maximize profits. Even in profit organizations the labor curves prove to be most complex, as a myriad of outside factors can affect the labor supply. Unlike other resources, it is difficult to determine how much total "labor" is available or the "quality" of the labor you will get. Normal supply and demand models do not succeed when it is difficult to predict labor's "contribution" to the "value" of the product. This is not to suggest that the study of labor economics is a worthless pursuit or that it is only useful in for profit organizations. All not-for-profit organizations experience labor costs and seek the same optimal cost-benefit point, where maximum labor contribution is achieved at minimum labor cost.

In the study of labor economics it is assumed that "available labor" is a function of people who are in the nation's work force. It is understood that the work force excludes from measurement those who choose not to work because their earning power is not high

enough to compensate them for working. A reason for not working could be the individual's expected low wage or some other function (e.g., currently attending school or being a homemaker) that leads them not to participate in the workforce. In basic labor economics, a large increase in minimum wage is always assumed to change some minds and expand the labor force. In general, quality in the labor force is based upon such factors as mental ability, education, health, age, and gender.

The study of military manpower adds three major complications to these factors in labor economics. First, as previously noted in Chapter Three, the labor system in the military is currently managed as a closed system where some personnel problems are more complex than those in the private sector, which allows for lateral entry. A sustained shortfall for several years in recruiting people at the entry level of any required skill set often means that the military will remain in a skill deficit for a decade and sometimes two. Recruiting shortfalls can only be corrected over time by experiencing higher than normal retention. Mid-grade officer and enlisted shortfalls occurred in the 1980's because of the large and unstructured exit of personnel at the end of the Vietnam conflict. Another example is current pilot shortage in the Air Force and Navy that had its roots in a 1992 military management decision:

Finally, it is true that the Air Force and Navy are short some two thousand pilots, but this is the result of two factors, one of them internal. In the first part of the 1990's, the military reduced the number of pilots in training below what was needed to sustain an appropriate level. As the chief of staff of the Air Force, General Michael Ryan, has acknowledged, "We made a terrible mistake six years ago when we reduced our pilot training to such a low level."⁸¹ This accounts for about 80 percent of the shortage.⁸² The remaining 20 percent of the shortfall arises because during the 1990s the civilian airlines were hiring in unprecedented numbers. There is no conceivable way that the military could have matched the

⁸¹ Korb cites Michael Ryan, Gen, USAF, *Armed Forces Journal International*, November 1998, p. 31.

⁸² Korb cites Carl Conetta and Charlie Knight, *The Readiness Crisis of the U.S. Air Force: A Review and Diagnosis* (Cambridge, MA: Project on Defense Alternatives, 23 April 1999), p. 12.

compensation or lifestyle of a pilot flying for Delta, American, or United, not even by doubling pay and ending deployments. Training more pilots would have been more effective than just throwing more money at the problem. (Korb 2002, 35)

A second issue of concern in the military's manpower management system is its "up or out" nature. The practice of promoting those with certain leadership skills over those with technical expertise was easier to manage in a time when technical knowledge was not as important as it is today:

For decades, military officers, enlisted leaders and senior Defense Dept. civilians have climbed the ranks and gained prestige according to basic, time-proven metric -- how many people they oversee or command. With few exceptions, responsibility and power are directly proportional to body count. That made sense throughout the Industrial Age, where "mass" was equated with power. But in today's Information Age, power is derived from knowledge and speed of action. Astute commercial businesses are moving in that direction, switching from pyramid-shaped management hierarchies to more of a network-or client-server-type structure geared to frontline decision-making....

Unfortunately, defense personnel structures aren't keeping pace with such shifts, and are actually hindering the incorporation of technology advancements that could have significant impacts on combat power.... In today's military, rank and power are directly tied to head count, and it doesn't matter whether a new-technology ship is much more efficient and performs better.⁸³

The current emphasis on pay increases in pay grades (rank) over experience (years of service) can be traced back to the initial anticipated move to the All-Volunteer Force. Congress had authorized a targeted pay increase that nearly doubled entry-level pay for officers and enlisted. Although such a pay increase at these entry positions was warranted due to traditional underpayment of conscripts, the compensation package was so targeted that it left little differences in pay between the pay grades. If promoted, responsibility would greatly increase but pay would barely change. A sailor moving from Seaman (E-3) with little or no supervisory responsibility to Petty Officer Third Class (E-

⁸³ Excerpt from "Promotion System Could Upset NCW" written by William B. Scott, found on page 59 of *Aviation Week & Space Technology* issue dated January 27, 2003.

4) who would be in charge of a work center of six to eight people could expect about a \$15 a month pay raise. The raise was certainly not commensurate with the increase in responsibility. When the time to decide to remain in the service came, many ambitious personnel chose a more lucrative civilian career. Specialized skills acquired through education and training, and the willingness to assume risk and responsibility were not properly remunerated, and personnel were no longer willing to assume them.

Many areas of education and training provided by the military are easily transferable to the civilian job market, and thus the retention decisions made by military personnel are influenced by the larger society's economic opportunities. Other training provided by the military, although crucial to military job performance, may not be as easily transferable. At the end of the Vietnam conflict, for example, the U.S. economy was expanding especially in airline travel and in the building of nuclear power plants. This expansion provided a large opportunity for military pilots, air traffic controllers, radar operators, electronic technicians, nuclear power trained officers, and enlisted personnel to find civilian employment at the end of their obligated service. Less in demand in those times were surface warfare officers, boatswain mates and signalmen, who had qualifications and training not highly prized in the general civilian sector.

A third difference between classic labor economics and that practiced by the military involves the "not-for-profit" nature of military service. There are no clear "cost" curves of material versus labor and no cost output measurement. So, the personnel manager cannot say that at a certain level of employment, with a specific level of pay, the Navy will maximize profit and achieve the optimal production level. The military manpower requirements determination process is left without quantifiable methods of

measuring recruitment or retention against a clear output measurable parameter.

Manpower has become a subset of a different requirements debate that centers on hardware.

In the Navy requirements start when the nation settles on the specific number of ships it needs in a given year. This process comes in the form of an open debate over risk. The number of ships is determined by seeking a proper balance between maintaining sufficient military power to 1) deter war, 2) defend the homeland, 3) provide coercive influence in diplomatic areas to achieve national objectives, and 4) provide freedom in trade required to achieve economic well-being. The fifth factor is the reality of political priorities in our representative system, where law-makers faced with limited resources do their best to budget expenditures in light of the nature of our political-economy. These criteria are balanced against the cost of ships. Adding more ships will lower risk but raise costs and vice versa. “How many ships?” is a question that must be decided on a continual basis or at least as frequently as national security threat levels change significantly:

As a matter of strict definition, military power should be distinguished both from armed *strength*, the capability for action derived from armed forces, and from *force*, the actual application of armed strength and the materialization of power through violence. Military power is ability; strength is its instrument; force is the overt exercise of power through the use of strength.

Whereas military strength is absolute, military power is relative - or, more exactly, relational. A nation's ability to influence another through the threat or use of force is limited by the countervailing strength of its adversary. Its actual power over the latter resides only in the margin of its superior strength.

A nation's military strength lies in its organized military establishment and leadership, and the whole complex of material, human, and organizational elements on which they rest. (Falk 1968, 140, emphasis in original)

Part of the debate over desired resources to be expended on the military will be a determination of the end strength that each military service will be authorized. This is the

maximum number or people (one authorization will be for officers and another for enlisted) that a service may have on the payroll at the end of the fiscal year. Manpower requirements represent the total number of people needed to carry out all the missions, but authorizations represent the total number funded at a given time. While fluctuations up and down during the year may exist, on the last day of the fiscal year the services must report their end strength numbers to Congress. The services receive budget dollars based upon this amount at a fixed amount per person rate. The services seldom want to maintain people above this authorized level because they would have to pay wages without having the authorized funds to do so. Also, the services would not want to end the fiscal year very far under targeted end strength because it would leave the message that they were doing adequately with fewer people than authorized. Perhaps Congress would see this lower number as an indication that future authorized manpower levels could be reduced.

The ideal number in any given year is neither an exact science nor entirely capricious. Total manpower requirements are determined by the use of the Navy Manpower Mobilization System (NAMMOS). This number incorporates Ship, Squadron and Shore Manning Documents (SMD's, SQMD's, and SHMD's)⁸⁴ into a plan for military and civilian manning, at wartime conditions and includes a mobilization plan in months (e.g., M+1, M+2, M+3, M+6 and M+12),⁸⁵ to reach these levels. All ships, aviation squadrons and deployable units are expected to be fully manned at M+1, while other activities are expected to reach mobilization levels by M+3. Thus it is normal that authorizations are set in order to fill operational units at full manning levels, and that non-

⁸⁴ The construction of these documents was discussed in Chapter Three.

⁸⁵ M in this case stands for mobilization. Mobilization is the formal start of military build-up period, either in preparation for a conflict, as was seen after the 1991 Iraqi invasion of Kuwait; or in response to an unexpected attack where the immediate response of mobilization is implemented. So M+1 means one month after mobilization.

operational units may be authorized at something less than a fully ready for war condition. The levels of manning in these documents come through determination of the unit's required operational capabilities (ROC) and projected operational environment (POE). New systems are evaluated for manning requirements using the Hardware Integration / Military Manpower (HARDMAN) system that establishes expected quantity and quality requirements for new systems:

Skilled manpower is an indispensable factor in the successful deployment of new ships, aircraft, equipment, and most other new hardware systems. The human element must be an integral part of system design and logistic support at the earliest acquisition phase. Although there is considerable uncertainty early in the acquisition process, every effort shall be made to use the best available data and techniques in developing manpower estimates. These estimates shall be continuously refined, as the system progresses, to form the basis for operational and maintenance manpower requirements' descriptions, personnel selection and training, training devices and simulator design, and other planning related to MPT. (Manpower, Personnel and Training) (Chief of Naval Operations 1998, Enclosure (1) 2-2 to 2-3)

Shore manning until 1988 relied solely upon the same requirements determination process that was used for ship and squadron manning. This practice changed with the introduction of the Efficiency Review (ER) process. Manpower requirements under the ER process are determined in terms of finding the best mix of military, civilian and contractor manpower to successfully accomplish the activity's missions. This realization that segments of the duties at shore stations could properly be civilianized is a key step forward in the military manning process.

After the mechanical processes have determined what would be the proper manpower requirements for the Navy, Congress authorizes an end strength number that will allow the Navy to deploy units at the mobilization levels previously mentioned. The Navy Manpower Data Accounting System (NMDAS) tracks quantitative and qualitative

information on these authorizations. Billets⁸⁶ or the positions to be filled are kept in the "billet file," which tracks required qualitative data (e.g. rate/rating for enlisted and grade/designator for officers).⁸⁷ The Navy Manpower End Strength Subsystem (NMESS) tracks real people with real quantitative and qualitative characteristics are tracked in. NMDAS produces Enlisted and Officer Programmed Authorizations (EPA and OPA) documents that identify which billets at any given activity are authorized to be filled by a real person. Thus, Congress sets a total Navy authorization level, and the Navy sets authorizations unit by unit.

It would be best if the quantity and quality of the people assigned exactly matched these identified authorized billets of EPA's and OPA's, but they do not. Since persons actually assigned rarely match positions authorized a percentage of authorizations is established at a particular command (e.g., CNO's Navy Manning Plan). For example, ships might be manned at 95% and shore stations at only 80%. Even if a command were manned at 100%, with the number of people assigned equaling the number of billets, it would be extremely rare for personnel qualities to match requirements billet by billet. Discrepancies would be expected in some pay grades. Designators in officers and enlisted ratings or special training codes are especially difficult to match. This difference is caused by a snapshot look comparing what would be a perfect manning situation, when the billet requirements were determined, and matching these perfect desires with the not so perfect world of transient personnel. The Navy manpower managers attempt to

⁸⁶ As noted in Chapter Two, a billet is a job in the Navy. It has specific occupational requirements including a pay grade, and prerequisite education and training completion.

⁸⁷ Rate is the pay grade of an enlisted person. Rating is the enlisted career field. Grade is an officer's pay grade while designator is their main occupational area. Pay grade is the step or degree in a graduated scale of officer or enlisted rank established by law. Currently enlisted pay grades are in the range of E-1 to E-9, and officers include pay grades O-1 to O-10.

provide the best possible match of existing people with current requirements. With such a difficult task, the people in the business of military manpower naturally seek the assistance of analysts and modelers to make the best possible matches.

Manpower Models

Manpower modeling is, of course, a subset of the whole process of models. Models seek to deal with an issue to determine probable outcomes that decision makers can use as guides for real choices facing them. In a battle model, for instance, decisions can be changed within it to see what the model predicts would happen. This type of modeling provides information without expending real resources of lives and material to actually answer the question. A model is said to be predictive if it can answer a "What if?" question. A simulation model tries to replicate an activity, such as a battle or weather simulation. In personnel planning, models are usually described as analytic when statistical treatment of normal distributions and past observed mathematical data aid predictions:

Modeling in its broadest sense is **the cost-effective use of something in place of something else for some cognitive purpose**. It allows us to use something that is simpler, safer, or cheaper than reality instead of reality for some purpose. A model *represents* reality for the given purpose; the model is an abstraction of reality in the sense that it cannot represent all aspects of reality. This allows us to deal with the world in a simplified manner, avoiding the complexity, danger, and irreversibility of reality. (Rothenberg 1989, 1, emphasis in original)

Modeling is necessary to add structure to the force that allows managers to address issues of concern to the whole or specific subgroups. The Navy, like any other large organization, has a wide range of occupations, many different levels of management and individuals with differing years of longevity. While a personnel model may look at

the whole, more often it examines the reaction of different subgroups to a proposed policy. For any model to work correctly, however, the personnel must be properly categorized and isolated from other cohorts. If the researcher has not properly subdivided the groups, then the "What if?" questions will be less likely to produce the true answer to the researched question, although it will produce an answer to something. Joe Silverman presents the problem in a clear if not succinct manner:

Essentially, the problem of personnel resource planning can be stated as follows. Specified numbers of enlisted personnel, in different occupations and at various pay grades, are needed each year in order to man the Navy's ships and its supporting shore establishment: these are the Navy's manpower requirements. To fill these requirements, adequate numbers of men must be input to the present force to assure sufficient manpower in the future. Given these needs, what can the Navy do about it?

More specifically, how many men should be recruited, trained, promoted, or discharged to meet these needs? What kinds of skills and skill levels are involved? What level of experience should be sought, and what is feasible, for each kind of skill? When should management take these personnel actions, and at what cost? Also, if the Navy is to reach certain personnel management objectives - such as a minimum level of promotion opportunity - the personnel force must be configured qualitatively as well as quantitatively. Answers to the above questions, and many others, must be framed in terms of some 100 different occupational specialties at nine pay grades and controlling for some 30 time in service intervals. In this restricted sense, Navy personnel planners are faced with the job of managing close to 28000 (sic) categories of personnel.

The monumental management task posed above is compounded by the fact that planners work in a complex and fluid environment. For instance, even while planning to ensure sufficient personnel to meet current requirements, those requirements are in the process of changing due to technological advances and shifts in mission. Manpower requirements are not the only fluid elements in the planner's decision-making milieu: others include the changing manpower budget; reflecting new or altered national priorities; periodic or continuing shortages of technical and highly trained personnel; and variations in the availability of manpower due to changes in demography, economic conditions and national manpower policy.

Within this problem environment, the Navy (1) attempts to establish, maintain, and balance inventories sufficient for present and future manpower requirements; (2) controls the short-run flow of personnel over time in order to operate within budgetary constraints; and (3) formulates programmes and policies designed to achieve longer range objectives concerned with promotion

opportunity, career development, retention levels, petty officer grade ratios, and projected cost, among others. (Silverman 1974, 263-4)

There are four distinct areas of classic manpower modeling: 1) Requirements Determination, 2) Recruitment or Supply, 3) Retention/Continuation or Inventory, and 4) Distribution. This does not mean that a specific model may not attempt to do more than one of these functions, but it does mean that separate investigation of the modeling techniques must be undertaken in each of the areas that the model addresses.

First to be examined is requirements determination, which is often considered the simplest of the models to design. Blanco explains:

Industrial engineers disaggregate each individual activity and then each required mission into tasks that must be performed as part of that mission. Once these tasks are identified, the time needed for each is measured by survey teams in a large sample of activities. This process provides statistical confidence in the measure. The time needed per task is multiplied by the number of tasks per period. The result is the number of man-hours required per activity. Conversion from man-hours to manpower requirements is based on the length of the work-week. Because the work-week is shorter on shore than aboard ship, a given amount of work requires more manpower at a shore activity; on the other hand, tasks often differ between the two environments. (Blanco 1982, 39)

As reported earlier, a number of manning documents report work to be done on ships, in aircraft squadrons, in staffs, and at shore stations on the basis of Required Operational Capabilities and Projected Operational Environments (ROC/POEs). This process of determining manpower needs produces programmed manpower authorizations that list the total Navy end strength to be funded for a given year. Relationships between numbers of operational units and ashore requirements, however, are often unclear. For instance, over 30 years sailors could have watched the Navy go from 900 plus ships (1972) down to 450 (1980), back up to nearly 600 (1989) and now back down to barely 300 (2002).

Operational units such as ships tend to show significant changes in total numbers as the nation perceives threats to its national security. Therefore, the total number of people required to serve in these operational units changes, whereas staff and shore stations are more stable. If the Navy adds or decommissions ten ships in a year (at current levels about 1/30th of the total number of Navy ships), billets on these ships are easily added to or cut from the total billet structure. But a similar size cut or addition (i.e., 1/30th) in manning ashore is not likely to also occur. In other words, building a total force is not simply a matter of adding together every unit's manning documents. Higher ranking billets, especially in operational units, require specialties that cannot be compromised. They require that persons serving in that billet have minimum levels of experience, training, education, and rate/rank.

For instance, an Executive Officer on a destroyer may have identified requirements of surface warfare officer, of grade Lieutenant Commander, with at least 12 years of service, including previous junior-level tours on ships. On the other hand, a shore billet may be less demanding in some areas and more demanding in others. Again an example is a manpower analyst position in the Pentagon may require a grade of Lieutenant Commander and an education in manpower analysis, but not specify exact years of service or warfare specialty. Therefore, in reality, the closed inventory system requires that, to get a surface warfare Lieutenant Commander with 12 years of service vital for an operational unit, other billets providing necessary education, training, and experience (both at sea and ashore) must be identified and reserved for this officer to exist when required by the ship. So, although Congress may recommission a ship with the stroke of a pen, an experienced crew must be already on the rolls ready to assume duty.

Personnel classification models are another subset of requirement determination models. These models develop and evaluate systems for personnel selection by first developing job performance measures to ensure that a person entering a job has the right skills. Next, the model is designed to develop mathematical modeling procedures that establish recruit quality factors allowing a person-to-job matching technique. The Armed Services Vocational Aptitude Battery (ASVAB) test is designed to identify qualifications that will allow the Navy to assign a new recruit to a proper occupational group and initial technical training. The determination of what jobs need what type of personal skills is performed by personnel classifiers.

The determination process must resolve some key questions, such as: "In what requirements issues should we be interested?" Sea requirements today focus on four functional areas: watch stations, maintenance, own-unit support, and customer support. *Watch stations* are the duties that are necessary to make the ship function at different levels of readiness conditions. They would include personnel manning on the bridge, in the engineering spaces, etc. *Maintenance* is the summation of tasks necessary to keep equipment at a high operational level, and includes both routine maintenance and repair work. *Own-unit support* includes those jobs needed to support the crew on the ship, such as cooking, cleaning and health care. And lastly, *customer support* is to provide items to others outside the ship. This category is usually used mainly to track work done by repair ships for other types of ships. These requirements, as summed up in ship manning documents, then become authorized billets on the ship. This manning requirements process often comes under criticism as non-military ships traditionally are manned well below military ship levels. For instance, because of non-occupational duties, DOD

previously avoided comparing requirements for a diesel operator in the civilian community with a diesel operator on a Navy ship. Now, however, researchers are no longer routinely accepting differences between civilian ship manning and Navy ship manning or between civilian occupations and Navy requirements. David Chu's questions shown in Table 8 still provide a good overview of requirements issues needing to be addressed in every requirements determination process.

Table 8 Questions to Ask in the Personnel Requirements Determination Process

<ul style="list-style-type: none"> • WHAT INDIVIDUAL CHARACTERISTICS DO WE WANT IN OUR PEOPLE?
<ul style="list-style-type: none"> ○ HOW DO THESE CONTRIBUTE TO THEIR ON-THE-JOB PERFORMANCE? ○ SHOULD THEY HAVE THESE AT ENTRY, OR SHOULD THEY BE ACQUIRED IN THE MILITARY? IN THE FIRST TERM OR LATER? ○ HOW DO THESE CHARACTERISTICS AFFECT UNIT PERFORMANCE? ○ WHAT IS THE VALUE OF FLEXIBILITY TO UNIT PERFORMANCE? HOW IS IT ACHIEVED? HOW MUCH IS "OPTIMAL"?
<ul style="list-style-type: none"> • HOW MANY PEOPLE WITH THESE CHARACTERISTICS WOULD WE LIKE? WHERE AND HOW WOULD WE WANT TO USE THEM?
<ul style="list-style-type: none"> ○ WHAT ARE THE BENEFITS OF "MORE"? OR "LESS"? CAN WE MEASURE THESE IN TERMS THAT ARE MEANINGFUL TO SENIOR DECISION-MAKERS (E.G., READINESS)? ○ TO WHAT EXTENT SHOULD WE RELY ON ACTIVE PERSONNEL vs. RESERVES? ON MILITARY PERSONNEL vs. "CIVILIANS"? ON DIRECT-HIRE EMPLOYEES vs. "CONTRACTORS"? ○ HOW SHOULD WE USE THE VARIOUS POLICY INSTRUMENTS AT OUR DISPOSAL TO ACHIEVE OUR MANPOWER GOAL?

Source: David S. C. Chu, "Setting Defense Manpower Requirements for the 1980's." In *Conference Proceedings: Naval Manpower Research in the 1980's*, ed. Stanley A. Horowitz, 32-38 (Alexandria, VA: Center for Naval Analyses, Report 58, 1982) 35, slide 8.

As seen in the following quote from the 1999 Military Operations and Research Society (MORS) symposium researchers are still trying to answer Chu's questions. However, modelers today are clearly challenging the idea of the military's uniqueness:

DoD should use private industry sources to help establish upper and lower bounds on certain key parameters. For example, DoD should look at similarly structured private industries and their retention rates for similar jobs (e.g. , an aircraft mechanic for Delta Airlines). For military specialties such as infantry where there is no private sector correlation, compensation for similar demographics - age, workload, time away from home, etc. - should be compared. (Thie and Fossett 2000, 11)

The second of our four types of models is the supply or recruitment model. Such models assess and forecast recruit market conditions to predict the total supply of possible recruits and to direct attention toward the most productive areas of recruitment. Thus, supply models rely upon demographic and economic conditions in the nation as a whole and in specific regions. Key factors include determining how to spend advertising and other recruitment monies most effectively. Supply models must focus on the characteristics of individuals being sought, such as mental category, educational achievement, physical well being, overall health, age, and gender. Entry-level models are very concerned with group characteristics, such as its past performance in enlisting and in also the completing their initial contract.

If a specific group shows high attrition, additional studies are conducted to help determine the cause. Supply models generally use regression analysis to see if cause-effect relationships can be made between past recruitment of targeted individuals (e.g., non-prior service, high school service, mental category I-III, etc.), and variables that can be used as predictors for the future (such as unemployment rate, minimum wage, advertising dollars, number of recruiters, etc.). Models are then constructed using elasticities derived from such analysis to predict past years, and then the actual results are compared with the forecast of these past years. If the model is able to approximate past years, it becomes validated and then is used to predict future year supplies. Richard

Elster, currently serving as the Provost at the Naval Postgraduate School, is a premier manpower analyst. He provides this synopsis on accession modeling:

There is general agreement about the variables that enter as predictors in enlistment supply models. These predictors include measures of unemployment, numbers of recruiters, advertising outlays, the G.I. Bill, eligible population, and military pay relative to civilian pay.

There is concern about how accurately the coefficients in the models estimate the effects of some predictors, e.g., the number of recruiters and the level of unemployment.

More work should be done to examine the responsiveness of enlistment contracts to nonpecuniary rewards, such as education benefits....

The services require a variety of enlistment supply models. Some effects are estimated better by time-series models, others by cross-sectional models, still others by mixed models.

Enlistment supply models need to be made less aggregate, so that supplies of enlistees can be forecast for separate occupations.

Supply models should be developed for special groups, e.g., for individuals who majored in science in high school, or for "older" non-prior-service males, prior-service personnel, community-college students, and women. Supply models should also be developed for some individual mental groups. (Elster 1982, 42)

Lost time and discipline models are a subset of supply models which look for subgroup differences. A lost time model might compare issues associated with the differences between men and women to see if pregnancy affects productivity. Singles versus parents, or multiple parents versus single parents might also be examined to see if effects are apparent for these different characteristics. Selection models are often designed to predict success based on some initial characteristic of the applicant. Costs to recruit and train high quality technical personnel would be reduced if predictors allowed the Navy to cut enlisted and officer drop out rates, especially in technical areas. As noted in Chapter Three, the ASVAB test is used as an aid for placing recruits into Navy jobs, and the accuracy of the ASVAB in identifying personnel traits is key. The ASVAB is a

highly refined product of psychological and aptitude testing originally modeled in the 1950's:

The US Military Services in order to be an effective organization must have competent personnel as well as the most advanced and effective equipment. This does not mean that the Services must have only the 'best' of the personnel pool, but does mean that those men taken from the personnel pool must be matched with jobs in a way that facilitates optimal utilization of the existing manpower assets. The development of effective measuring instruments and of ways and means of using these instruments for assigning men to jobs on the basis of the measure of abilities is a crucial problem that constantly demands new and better solutions. While no man can be trained, no matter how extensive and careful the training, to do all the jobs as well as those who do them best, most men accepted by the Service can be trained such that they are effective in performing those skills for which they are most apt, and when properly assigned, will be an asset to the Service.

In this particular application we are principally concerned with the characteristics of performance estimates (and the test battery from which they were derived) as they relate to the criterion of personnel allocation efficiency as provided by the average predicted performance under conditions of optimal assignment. This measure of performance is the objective function to be maximized by a linear programming algorithm. Many relationships involving this objective function and selected variables of this study may easily be calculated analytically - assuming ideal conditions, e.g. continuous normally distributed psychological test scores. (Johnson and Sorenson 1974, 44-45)

The third of the four types of models is usually called an inventory model. Such models examine a group of people at various levels of detail, but usually by length of service (LOS) and pay grade (officer or enlisted). After an available homogeneous inventory (such as an enlisted occupation) currently in the military is taken, continuation rates and promotion rates are determined. Then the model "ages" the force to predict future inventories. An inventory model could also use a recruitment model that would show future entry levels, which it would then process. This "aging" process relies upon continuation rates by either extrapolating rates over some previous period (e.g., current rates, past five year average, past 10 year average) or in a pure forecast mode (such as, "What will the inventory look like if some personnel policy is enacted?") It should be

further noted that such forecasts can make their predictions month by month. Such regular predictions allow strength planners to judge proper inventory levels while helping budgeters to calculate the cost of the force and to meet end strength restrictions previously discussed.

Rate generator models, which are subsets of inventory models, allow changing the continuation rates used in the inventory model based upon new policies. For example, a policy of increasing a bonus would use an econometric rate generator model to produce the loss rates or continuation rates used in the main inventory model. These rate generator models, which are usually the least understood by senior manpower managers, are really the most crucial part of most manpower model assumptions. For instance, a manpower manager might want to know: "How much effect on retention will getting a smaller than expected annual pay raise have on a certain special group?" The rate generator model, after changing the continuation rate, will predict the answer. The assumptions of the rate generator model are almost exclusively based upon economic elasticity studies that show a range of possible outcomes.

If the model shows too much attrition in a certain rate, currently the only way to increase the predicted inventory is to raise a continuation rate, usually by entering the rate generation model and then increasing pay. Numerous current models used to predict force levels are based on a study by the economist John T. Warner while working for CNA. Warner's approach is based heavily on econometrics because its original purpose was to provide managers with choices of compensation packages to determine which package would provide the most desirable outcome. His Annualized Cost of Leaving (ACOL) model (Warner, 1981) is based upon one key variable: namely, the difference

between the pay that an individual would receive by staying in the military and the pay that they could earn in a civilian job. In computing "military pay," the model sums base pay, sea pay, housing allowances, plus specialty and reenlistment bonuses. The model then computes rates for length of service factors that are applied to weighted historical rates:

In 1982, Dr. Warner addressed a two day conference held by CNA and described the economist approach to "Navy Manpower Issues" as follows:

As I see it, there are four primary characteristics of the economic approach to defense manpower problems. The first characteristic is that the economic approach is concerned primarily with efficiency. According to this approach, the goal of manpower managers should be to determine the set of compensation and personnel policies that will obtain the desired force at the least cost. This concern with efficiency is in contrast to the concerns of many other people, who tend to weigh such considerations as equity much more heavily....

The second characteristic of the economic approach is the proposition that people respond to incentives. Higher military pay increases supply; lower pay reduces supply. Study after study has confirmed the validity of these propositions....

This is not to argue that pay is all that matters, as economists are frequently misinterpreted as saying. Recent research has shown that non-pecuniary factors, such as the extent of sea duty and separation from family, have a significant impact on retention decisions. These results suggest that the quality-of-life programs that the Navy is now studying may in fact have a beneficial effect on retention in the 1980's.

The third characteristics of the economic approach arises from the recognition that people have diverse preferences for various consumption goods. This diversity of preferences suggests that the compensation system should rely primarily on cash incentives...

The last of the four characteristics that form the core of economic approach to defense manpower issues is the proposition that personnel prefer current dollars to future dollars; that is, they have positive "discount rates." This preference for current dollars is greatest among young people.... (Warner 1982, 5-6)

Finally the last of the manpower model types to be discussed are the distribution models. Distribution models attempt to match available personnel (of appropriate rank/grade or rate/designator and education or skill category) to billet requirements. Such

a model may attempt to look at the officer or enlisted master file, screen qualities of personnel with their expected rotation dates, and find a match to an impending job opening caused by another's rotation. Another function of a distribution model will be to spread shortfalls of personnel qualities evenly across the billet system. This result could be achieved in an even percentage or by some policy such as filling operational billets at "x" percentage and then all others at "y" percentage. While distribution models project inventory available for rotation, they usually avoid "aging" the existing members with continuation and promotion rates. With proper use of a distribution model, therefore, a detailer could find for an individual all vacancies occurring around a projected rotation date and thereby could provide to a sailor the greatest selection of new assignments. Sea/Shore rotation policy is also a distribution problem that aligns personnel inventory with billet authorizations:

Large-scale military personnel systems have typically worked out a classification structure tailored to their unique purposes. The classification structure categorizes each job in the organization in terms of the major duty which is to be performed by the incumbent of the job. The structure also assigns to each individual in the system a label which identifies the kind of job which he is qualified to fill. These categories are ordinarily rather broadly defined. For certain management purposes it is desirable to establish a relatively small number of categories of jobs or career fields....

(I)ndividual members of the organization can also be classified by essentially the same structure used for categorizing jobs. In the case of personnel, classification is in terms of jobs for which they are qualified. Through training and experience, personnel advance from an entry skill level in a career field to the journeyman and perhaps to the supervisor and superintendent level as their careers in the organization continue.

Using this classification structure, assignment managers can attempt to fill newly created or vacated jobs with personnel holding the career field and skill level qualifications demanded by the jobs. The assignment problem, reduced to its basic dimensions, becomes one of locating and redistributing personnel who are qualified to work in a particular career field and at a given skill level. (Bottenberg 1974, 67-68)

The Navy Personnel Research, Studies, & Technology (NPRST) organization introduced in Chapter Two is actively involved in manpower modeling issues for the Navy of the future. "Sailor 21"⁸⁸ is NPRST's planned manpower study for the next five years. It splits supply model issues into two pieces: the first being labeled "Recruiting" and the second as "Selection and Classification." Inventory modeling issues are covered in "Personnel Planning and Policy Analysis," while the "Distribution and Assignment" section addresses traditional distribution issues. NPRST, which seems to conclude that requirements modeling research is currently sufficient, subsumes it under its ASVAB section of "Selection and Classification." "Sailor 21" suggests that the nation expects the military to be well-trained for war-fighting, but that this goal can only be achieved by recruiting and retaining high quality people. "Sailor 21," like this report, recognizes two key issues as vital to the overall preparedness challenge. The first issue is that technology is reducing manpower requirements in the Navy, and the second issue is that those personnel who remain are required to be high tech sailors with higher day-to-day demands on them, than those of the 20th century sailor:

Technological modernization of the Navy in the 21st Century will only accelerate these changes. For example, the next generation Navy surface combatant (DD-21) is expected to use fewer than half the number of crewmembers deployed on current destroyers. Such a dramatic reduction in the number of personnel will radically alter the task requirements for any one Sailor and by implication, alter the content and scope of the jobs defined by current classification models. At the very least, each Sailor will be required to perform a broader range of tasks, have more sophisticated technological knowledge and skills, and will operate more independently with fewer coworkers and a truncated chain of command. This implies that current jobs will have to be redefined in light of the new requirements, and that the aptitudes, skills, and training requirements in support of these jobs will have to be reviewed to update selection and classification composites. Jobs that are largely mechanical in nature may become more electronic in the future, and thus the classification composite may need to be

⁸⁸ Navy Personnel Research, Studies, & Technology's "Sailor 21." Go to: <http://www.nprst.navy.mil/Sailor.htm>. Last accessed by author January 2003.

altered to include electronic or mathematics knowledge. Jobs with small scopes may be broadened, dramatically increasing the cognitive complexity of the position such that a generally more able Sailor will be required to minimally succeed. Jobs that now allow individuals to work in isolation, say on the internal communication system of a ship, may be recast to cover all shipboard communications, requiring the individual to work more closely with other electronics, information, and communications ratings, and have a much broader knowledge of electronic and power systems. In general, far fewer men and women will execute a ship's mission and each one will have a much broader scope of job responsibilities, will operate in very complex information-intensive environments, make substantially more independent decisions, work better on teams for process goals, and be technologically more sophisticated than today's service members. The instruments and methods we use to identify and assign these new Sailors will have to be modified, improved, or developed from "scratch." This requirement represents our mandate and challenge for the future. (NPRST 2002, www)⁸⁹

In the early 1980's the Navy experimented with another form of requirements determination which placed manpower flow modeling in a preeminent position. Under the direction of Admiral James Hogg, head of the Navy's Manpower Policy Branch (OP-13) a group of analysts created the Navy's "Balanced Force Model."⁹⁰ It had been observed, as previously mentioned, that although over time the number of Navy ships rises and falls shore requirements and therefore the total billet structure of the Navy does not react in a proportionate manner. For instance, while research found a base set of shore billet requirements that would slightly rise and fall as the number of ships did, certainly a 10% rise in the number of ships did not equate to a 10% rise in the total size of the Navy. Nor did reductions in the numbers of ships cause an equal percentage decline in total Navy size. A further examination of these shore base of billets revealed that they could be divided into two categories: those requirements that previously rose and fell with the number of ships and those that did not. Those shore billets that rose and fell in concert

⁸⁹ Exact web subsection of this report is: <http://www.nprst.navy.mil/S21/S3.htm> last accessed by author January 2003.

⁹⁰ The three analysts were Thomas Eubanks, Thomas Halwachs, and William Ferree.

with the numbers of ships were primarily in occupations most directly related to ship needs. In the other category, billets that did not change with ship numbers were mainly general labor positions where on-the-job training would be sufficient. Up to the time of this study, these billets were generally coded to be available to numerous detailers.

On the personnel side, "Balanced Force" analysts, through historical inquiries, found in each occupation some distinct operational position that could be identified as a key flow or "choke point." A choke point in a rating or officer designator was seen as the most vital operational tour which must be filled with a high quality person. Historically, if this choke point was correctly filled, adequate personnel would be available for subsequent tours. For example, in the surface warfare officer community, this key operational "choke point" was determined to be a destroyer executive officer. If enough high quality Lieutenant Commanders were available to serve in this position, the surface community would be mission ready. The next step was, by use of manpower flow models, to predict a steady state flow of personnel through each rate and designator to achieve the desired manning of the choke point.

The output provided a pyramid shape of expected personnel at various grades and years of service that one would expect in a community to support that community's operational choke points. After subtracting from this pyramid specific occupational billets identified at sea and shore a number of billets remained that the base general billet pool would be required to fill. The "Balanced Force" then moved to code these general shore billets in ways to ensure that the occupational community would have adequate non-operational assignments. Shore billets not required to support operational community needs could be more easily converted to a permanent civilian position. Because the

"Balanced Force" was designed to cover the Navy in both growth and downsizing it became the planning standard for the buildup to President Reagan's 600 ship Navy. Unfortunately, when the downsizing of the Navy occurred in the early 1990's, personnel managers decided to do this reduction in the form of "fair sharing" the downsize and failed to use the "Balanced Force" methodology.

Of note for this study was the Navy's heavy reliance in the "Balanced Force" methodology on one force projection model (e.g. SWOTOURS). ⁹¹ This model was meant to display not only force projections at "steady state" but to also structure billet requirements. Although specifically designed to look at surface warfare officers, this method became the staple for most officer community plans. Basic assumptions of the model in its use of continuation rates were never challenged and "What if?" questions concentrated solely on monetary issues.

Manpower Modeling Issues

Manpower modeling depends upon stochastic modeling techniques that show a probabilistic description of personnel inputs, flows, and outputs over time. A stochastic manpower model displays the probability of a person continuing as s/he passes through a cell of a matrix.⁹² Although modeling in general can be traced back to the mid-1940's, in the early 1970's it became widely used by researchers across a broad area of specialties including manpower and operations research. In a military manpower model matrix most likely its rows are based upon years of service and its columns based on pay grade. Thus, if the model sets the probability of a person of pay grade Lieutenant (O-3) at a .988 level

⁹¹ The model was SWOTOURS as was developed by Paul Milch at the Naval Postgraduate School in Monterey, CA in the late 1970's and modified in 1981. (Ferree 1981)

⁹² This matrix was previously described earlier in this chapter, during the description of inventory models. Matrix rows usually contain years of service and columns identify pay grades.

in year of service five, it is predicting their probability to make it to year of service six. In other words, for every 1,000 Lieutenants with five years of service, the Navy would expect 988 to continue to remain in active service over the year. Next this 988 number is multiplied by the probability residing in year of service cell six to see how many should continue to year seven.

If a model allows no variation in the numbers of the cell, it is a deterministic model. Such deterministic models are used by life insurance companies to determine actuary probabilities and to set their insurance rates. Deterministic models can be said to work best with large numbers as statistical variation is negligible in such samples. Thus, when working with large segments of the military such as the whole officer corps, deterministic models are sufficient. When working with small numbers such as an officer community of only a few hundred people, statistical deviations could greatly change the outcome. For example, continuation rates of all enlisted personnel could show a fairly high number like an 85% retention of people in their first five years. Individual occupations may be grossly under retained, however, and this fact can be hidden in overall numbers. As the GAO reported recentl: "In the last quarter of fiscal year 2000, the services reported they were generally successful in retaining more personnel at the aggregate level but were still concerned about readiness in selected critical skill areas" (GAO 2001b, 4).

Stochastic modeling, especially models commonly identified as Markov chain models, were originally designed to forecast manpower behavior. They were designed to tell us what is going to happen in the future if conditions remain unchanged. Managers began to look at the models to see if they could use them to determine how to control the

future. Since the military personnel system is a closed system, each part is highly dependent on previous parts. Changes in continuation or wastage rates affect vacancies, but so do promotion rates, the flow of inputs at the bottom, and losses at the top. This means that the total force shape can be changed by management actions which only increase recruits, only affect promotion, or only change continuation rates, or by management actions that incorporate more than one aspect.

How these continuation rates are derived is of major interest. These stochastic models were originally designed to predict where current policy was leading the organization. This goal could be achieved by using current continuation rates of the last year and projecting them over the next ten years. This projection would show the expected flow of personnel in the organization. Others who judged taking only last year's rates as shortsighted, would insist on using a five, ten, or twenty year average of each cell of the matrix and using this "average" in the model as the predictor.

When the model attempts to move from predicting an outcome to producing an outcome, it has certainly moved exponentially upward in level of difficulty because the model is now using another statistical approximation to predict how each general cell will react to outside influences. For example, the question considered by the analyst could be, "How will this community react to the raising of their promotion opportunity?" The new rates produced by the specific "What if?" question are then used in the model to generate expected flows. The predictive rates, themselves a statistical estimation, are further adjusted by an estimation of a policy decision's impact. In expecting finite predictions to come true, high-level Navy decision makers often fail to understand that the model is

only predicting *a range* of possibilities. So a range of consequences to such a management action is what really exists:

One of the chief shortcomings of existing models, particularly those of the Markov chain variety, is that they treat as independent things which common observation suggests are related. For example, it seems likely than (sic) an individual propensity will be influenced, among other things, by his own estimate of his promotion prospects. This estimate will be based on the observed experience of similarly placed people in the organization and on its structure and age distribution, etc. If the nature of this relationship could be found it could be incorporated into the model. This would undoubtedly complicate the mathematics but the effort would be work making. (Bartholomew 1974, 87)

The primary purpose of retention models is to predict the behavior of the military person at retention or reenlistment time. Currently the models rely upon compensation comparisons as the primary way in which an individual will make this decision. The models predict that the sailor will judge current expected military compensation against expected compensation should the sailor move to the civilian sector. Therefore, the sailor's choice is affected both by what the military compensation package is and by opportunities in civilian life. It is recognized that non-pecuniary factors such as deployment time and/or grooming standards could influence an individual, but in current models these "taste" issues are usually seen as a wash in the large numbers of people considered.

To many sailors the Navy is their first true employer. Their impression of service life is greatly influenced by their recruiting experience, boot camp experience, and first duty assignment. Some researchers have concluded that these tastes are fairly consistent in people and therefore are key only in the first retention decision. People who remain in the Navy at the first retention opportunity are more likely to remain at the second opportunity and more likely at the third, etc. This kind of thinking would impel the

researcher to say that financial incentives are most effective in the first years of service and could be dropped in later years. Senior Navy manpower decision makers rightly resist such recommendations, however, because they see equity issues if junior personnel were to begin receiving pay equal to or higher than their supervisors.

Although pecuniary research abounds, the first and apparently only major study of non-pecuniary effects on military labor supply came in 1981. John Warner and Matthew Goldberg, working for CAN, examined the effect of sea duty on Navy reenlistment rates. Not surprisingly, they found that "larger pay increases are required to elicit a given reenlistment response to those occupations where the incidence of sea duty is high" (Warner and Goldberg 1981, 2). What surprises is the lack of follow up studies in non-pecuniary issues. Warner and Goldberg's suggested that the Navy not increase its personnel size to lessen sea time, but to actually increase sea time and concurrently increase bonuses in certain occupational areas. Specifically they report "that the Navy may increase ship manning more cheaply by raising bonsues (sic) and increasing the extent of sea time than by holding constant (or lowering) sea time and raising the total size of the Navy" (Ibid., 21). The other non-pecuniary issue examined in this study by Warner and Goldberg was that married sailors were more likely to reenlist than single persons. Their conclusion was again based solely on compensation issues relating this difference to the greater importance of medical benefits to married personnel than to their single counterparts.

During interviews the current Navy personnel managers were mostly skeptical, that there could be much value to be gained from non-pecuniary studies. Suggestions that the Navy should pursue the theory that high-tech personnel would respond to something

besides bonuses were generally seen as "not intuitive." Interviews with civilians outside the Navy but engaged in Navy personnel research led to the exact opposite opinion, however, with most genuinely interested in such possibilities. In the Navy, bonuses have now become an expected part of the pay equation. It is highly unlikely that one could remove any group's bonus without some offsetting form of compensation and not expect an initial adverse reaction. As was discussed in Chapter One, Herzberg (1966) questioned management's popular belief at the time that wages are the worker's primary motivational factor. Herzberg stresses the importance of other motivations specifically identifying satisfiers and dissatisfiers.

The removal of a satisfier once it has been accepted as part of "normal" and "expected" rewards turns it into a dissatisfier. This study does not claim the monetary factors are not important. Rather it challenges the one-dimensional approach that wages are all that are important. Although all models include military retirement in their monetary calculations, they usually discount their value because personnel were assumed to "undervalue" the retirement system. This assumption caused the Navy some problems in the mid-1980's when a new retirement system was first introduced because the retention rate dropped much farther than models had predicted. The removal of a benefit definitely causes a negative retention reaction. The suggestion of this study is not to reduce sailor's pay by removing bonuses but to increase attention to non-pecuniary issues that would increase a professional person's job satisfaction as a cheaper alternative.

At the opening session of the Military Operational Research Society's (MORS) Mini-Symposium in September 1999, the Marine Corps presented an idea called "Global Satisfaction." The idea was to consider each person as a composite of numerous

influences. This Marine's conceptual model is displayed in Table 9 and includes a focused section on Quality of Life (QOL) issues:

It is not enough to say, "*We must retain a quality force.*" QOL and retention solutions are complex, and oversimplification of the problem is a failed strategy. We need empirical evidence and must establish causal relationships between aspects of "life satisfaction" and unit/system readiness to make our case for resources. (Thie and Fossett 2000, 97, emphasis in original)⁹³

Table 9. Direct Influence and Cause on Retention

"Global Satisfaction"	
<i>Compensation:</i>	<i>Tempo:</i>
<ul style="list-style-type: none"> -Direct -Indirect -Deferred -Perceptions 	<ul style="list-style-type: none"> -Deployment frequency/length -Predictability -Family Separation -Inter-deployment Time -Working hours/day -Tempo when others deploy
<i>QOL:</i> <ul style="list-style-type: none"> -Family -Health -Work Circumstances (maintaining levels, spare part availability, etc.) -Intangibles (esprit de corps, values, leadership) 	
Memory Vs. Expectation	

Source: Harry Thie and Christine Fossett, *Military Recruiting and Retention for the 21st Century Mini Symposium Proceedings, 27-30 September 1999* (Alexandria, VA: Military Operations Research Society, MORS, 2000) 8, Figure 2.

Note: Original used a circle vice a square to enclose listed variables.

⁹³ Quoted from the section covering pages 93-104, "Working Group 6 Influences/Causes of Retention". LTC Eli Alford Chair and Dennis Baer Co-Chair.

The larger gathering at the mini-symposium concluded the following on this subject:

(M)any of the key independent variables that influence retention are not well defined or measured. Compensation is both well defined and well measured; hence, it is well studied. Tempo is defined but not well measured. Quality-of-life is neither well defined nor well measured. Leadership is defined in the dictionary but is difficult to capture (measure) in a way that can be entered into multivariate analysis of retention influences. ...

Our data captures past events (what soldiers remember), but retention decisions may be based more on anticipation of future circumstances. (Ibid., 8)

This summary is accurate for the issues it covers. However, an additional factor that needs to be added, could be labeled "Professionalism." This new area would cover the differences of the new career soldier or sailor of the 21st century, when compared to the unskilled yeoman of the past. High-tech professional 21st century sailors will require the manpower system to recognize their professional characteristics, and to understand their desire for such career enhancements as education, promotion opportunity, and currency training in skill areas, to name a few.

Manpower Surveys as a Research Instrument

Surveys are an important means by which an organization may receive feedback from its personnel on how the organization is perceived to be meeting its part of the contract. The Department of Defense (DOD) and the Navy both began to use surveys widely in the early 1970's. Early surveys, which generally dealt with very narrowly focused issues, were poorly constructed and documented. The first large DOD personnel survey was conducted in 1971, and repeated in 1973 and 1976. These first three DOD surveys were early attempts at getting the process right, and the data collected were generally of not much value for policy analysis. In 1978, the DOD survey was greatly

expanded and the design was turned over to RAND in hopes of capturing more useful data. Large surveys continue to be refined but their frequency has been reduced. After the 1978 DOD survey, there were active duty surveys conducted in 1985, 1992, and 1999. Specifics of the 1999 survey will be presented in depth in Chapter Five.

The primary goal of these surveys has been to collect information about a military member's career intentions and what policy issues may affect that intent. Simultaneously the survey can collect characteristic data on the individual and look for correlations that are important to the organization. For example, individual sailors may not feel that their decision is greatly affected by their age, education, or marital status, but analysis of the survey results may show these factors to be important when the whole cohort is considered. Finally, a survey can sometimes gather information that is important in grasping group perceptions of pending policy issues, such as proposed retirement systems or the value of the current retirement system on an individual's retention decision.

Beside this active duty survey, DOD routinely conducts surveys of enlistees at the Armed Forces Entry Examination Station (AFEES) to collect comprehensive socio-economic data that allows analysis of entrants' characteristics and their subsequent career moves by tracking these sailors in the manpower data base. This step enables comparisons such as mental category differences, which are then tracked through the enlistees' decisions of advancement and retention without additional surveys. In addition, randomly selected personnel are sent surveys upon leaving the armed forces in the hopes that their reasons for leaving can be accurately identified.

In the Navy, two large surveys are used to supplement the data found in the DOD-wide surveys. The Navy Personnel Survey (NPS), first issued in 1990, is an annual

survey designed to sample about 25,000 sailors on general issues, and the New Recruit Survey (NRS) samples Navy-only enlistees attitudes upon accession.

The NPS survey contains three types of questions: (1) core job satisfaction, organization effectiveness (e.g. leadership), and career questions, which would be repeated in each survey; (2) questions of interest to program managers (e.g., retention, attrition, benefits, etc.) which would be repeated in each administration; and (3) "hot items" of interest at the time of the survey (e.g., spouse employment, equal opportunity, etc), which may not be repeated in subsequent surveys. ...

New Recruit Survey (NRS) ... asks about reasons for joining the Navy (influence of advertising, recruiters, relatives, friends, incentives, etc.) It queries respondents regarding their career plans and expectations. (Somer 1991, 28)

Except for these key large surveys, most survey research in the 1980's and 1990's was on individual projects that addressed issues of narrow interest to the sponsor of the project. Such one-time surveys provided little opportunity to see if the survey was anything more than a snapshot. As the military has downsized, there has been a significant decrease of manpower studies and surveys. A principal reason for such a reduction is the cost of "paper and pencil" surveys. Reduced budgets of research sponsors such as ONR have left many projects on the drawing board. NPRST is hoping that the internet and computers can cut costs in this area and allow some revival of service specific surveys:

Surveys and evaluations are expensive. When done correctly, large-scale personnel surveys and program evaluations are expensive. For example, Navy mail-out surveys typically cost between \$100K-\$300K to conduct. Program evaluations can easily require multiple years of funding costing hundreds of thousands of dollars. As we explore alternative means of survey and evaluation administration, one goal should be cost savings. For example, if it were possible to conduct a large scale personnel survey over the Web, tens of thousands of dollars of postage charges incurred on mail-out surveys would be eliminated. (NPRST 2002, www)⁹⁴

⁹⁴ Exact web subsection of this report is: <http://www.nprst.navy.mil/S21/PS5.htm>, last accessed by author January 2003.

One advantage that computer surveys could provide would be quicker collection of data. If manpower research monies are to come more from operational budgets instead of their traditional research and development funding source, then the data gathered need to meet the policy maker's real time needs. Another area of concern to researchers that may be mitigated by electronic collection of data, is the recent marked decrease in response rates to Navy surveys. Possible explanation, for this decline in surveys being returned include personnel being over-surveyed, surveys that are too long or too detailed and the feeling that the information is just not going to be seriously considered by policy makers. "The response rates to Navy surveys have been gradually diminishing. For example, in 1989, the Navy Equal Opportunity/Sexual Harassment survey had a response rate of 60%. The 1997 administration of the same survey had a response rate of 45%" (NPRST 2002, www).⁹⁵

Whether or not the Navy stays in "paper and pencil" surveys or moves to electronic ones, policy makers will continue to require an efficient process of gathering data from the force it wishes to manage. The demographics will continue to evolve as the Navy becomes smaller and more high-tech in nature, and the survey process must embody the latest in social science theory and statistical procedures.

Technology as a Labor Shortage Solution

In Chapter One the idea of technology and its influence on humanity in general, and on the Navy's manpower management system in particular was introduced. When considering technology in its widest meaning it almost seems necessary to develop a philosophy toward technology as friend, foe, or neutral. Alan Drengson identifies these

⁹⁵ Exact web subsection of this report is: <http://www.nprst.navy.mil/S21/PS6.htm>, last accessed by author January 2003.

four possible philosophies, 1) technological anarchy; 2) technophilia; 3) technophobia and 4) appropriate technology.

Technological anarchy was a dominant philosophy throughout much of the nineteenth-century industrial development of the West. In brief, technological anarchy is the philosophy that technology and technical knowledge are good as instruments and should be pursued in order to realize wealth, power, and the taming of nature....

Technophilia, as the word implies, is the love of technology. It is like the love of adolescence. Humans become enamored with their own mechanical cleverness, with their techniques and tricks, their technical devices and process. The products of our technology become not only productive instruments but also our toys. Technology becomes our life game....

Technophobia emerges when it is realized that only human and humane values can curb the threats of a technology running out of human control. As an extreme reaction technophobia attempts to detechnologize human life, for to many persons the idea of applying engineering techniques and technocratic control to all aspects of human culture is repugnant....

Appropriate technology represents the fourth stage of technological development ... The fourth stage involves a maturing of the reciprocal relationships between technology, person and world. Appropriate technology requires that we reflect on our ends and values, before we commit ourselves to the development of new technologies, or even to the continuation and use of certain older ones. (Drengson 1990, 29-32, emphasis in original)

This study supports the idea of adopting a philosophy of "appropriate technology" that recognizes the interaction of technology and humans. For the U.S. Navy in the second half of the twentieth century, the introduction of technology was designed to lighten the labor of sailors on ships or shore, as well as reduce their numbers. Although both of these goals were achieved several unanticipated consequences occurred. The new technology designed primarily to save labor gradually required operators and maintainers of a more sophisticated character and with higher education levels than the laborer whose work the machines were originally designed to assist or replace. At the end of World War II, manned gun mounts, used in naval gunfire support ashore and against air targets, required around a dozen persons to operate. In the 1970's with the addition of automation

newer gun mounts had reduced required manning of the mount to three persons. By 2000, U.S. ship gun mounts were completely unmanned. The labor force that formerly manhandled powder and projectiles in a mechanical mount was slowly replaced by technology. The mounts themselves had been maintained by this same labor force that operated them. Being made mainly of gears and hydraulics, the mounts were mechanically not much different from the automobile and farm machinery sailors had grown up with as young men. However, just as the cars of today generally defy "home repair" because of their increased reliance on electronics, Navy gun mounts developed beyond the skill level of the low-tech sailor. Rating changes have reflected this technological change as more and more occupations turned from labor intensive skills to high-tech. For example, in the early 1970's, the Navy introduced the GMT (gunner's mate, technical) and GMM (gunner's mate, missiles) ratings to replace a gradually phased out GMG (gunner's mate, guns) rating.

Total personnel needed on ships did not fall as quickly as was first expected because, as the Navy developed its war-fighting technology, additional technical hardware on the ships required new operators and maintainers. These new ratings were uniformly high-tech personnel. Again using the gun mount as an example, as aircraft became faster manned training (pointing) of the gun mount could not be tolerated. So, fire control radars tracked targets and gun mounts became electronically trained as determined by fire control computers. New rates were required to operate and maintain the fire control radar (FC -Fire Control Technician) and the associated computers (ET - Electronics Technician). Similarly, regarding the power plant the Navy hoped that moving from steam systems to gas turbine engines would help reduce personnel. In fact,

some reductions in engineering personnel have occurred, but the education level and technical training required of the new plant operators has greatly risen:

Fiscal restraints, among other considerations, compel the Navy to build ships that will operate with smaller crews at the same time that naval operational environments require it to increase its capabilities. Fortunately, advances in technology make satisfaction of both of these demands possible, and this will be accomplished if technology investments are made now to ensure that these advances are included in the design of future ship classes....

These reductions are not uniform across ship operating departments. Manning for some combat systems departments has increased more than 30 percent in the past half century due to the addition of sensors (e.g. large, phased - array radars; large, bow-mounted sonars; satellite communication), computers and weapons that did not exist earlier, whereas manning for some engineering departments has experienced a 30 percent decrease due to the substitution of gas turbine for steam propulsion. (National Research Council 1997, 28)

As the Navy retired World War Two vintage ships in the early 1970's, it was able to eliminate ships with extremely high labor demands, but the ships of the 1970's and 1980's were larger in general, and therefore, the crew size seemed to remain constant. Even during the late 1970's, however, the crews that the Navy was seeking were those of a higher technical nature than in the past. A new ship design, the "Spruance" class destroyer, was introduced in the early 1970's. Originally this 563 foot, 7,800 ton ship was planned for 225 crew members, fewer than the crew size of frigates (crew size 285) which were less capable and smaller (445 foot, 3,600 tons) than ships in the fleet at that time. However, as the Spruance class destroyer was in its final development stages, the Navy added additional weaponry and the crew size swelled to over 300. Such also was the fate of the "Oliver Hazard Perry" class of frigates which made it to commissioning with reduced manpower plans, but almost immediately fell into decreased combat readiness because of maintenance issues. Consequently, high-level Navy decision makers manning was increased to maintain operational effectiveness (Coe 1995, 93).

The Navy recently began further experiments in reduced manning procedures in an operational environment tagged the "Smart Ship Project." In 1996, the Navy selected the USS Yorktown (CG-48) (a "Ticonderoga" class cruiser, 566 foot long, with 9,600 ton displacement and originally carrying a crew of 375) for a test of reduced crew. The addition of new technologies (costing about \$5.6 million⁹⁶) allowed reduced manning on the bridge and in the engineering plant, as well as reduced normal watch station procedures and preventative maintenance schedule. This ship embarked on a five month "drug interdiction" mission in the Caribbean with a nearly 15% reduced crew size (44 enlisted and 4 officers fewer than crew size at program start.) Evaluation of the project received a mixed review as OPTEVFOR (Operational Test and Evaluation Force) reported that the "Yorktown demonstrated the ability to execute required operational missions with reduced manpower"(Pringle 1998, 21). Commander Naval Surface Force Atlantic (CNSL) stated cautiously: "With regards to sustainability, CNSL observed that a primary concern of this assessment is whether the Smart Ship concept is sustainable. Specifically, it must be determined if a smaller crew can sustain the ship and its equipment, as well as itself" (Ibid.). As far as cost savings realized from reduced manpower, a 1997 study by Matthew Fleming concluded that if Smart Ship procedures could be enacted on even 100 ships, compared to the dozen or so planned, the Navy's overall budget would be reduced by one-half of one percent (Fleming 1997, 5). No matter what the success of Smart Ship proves to be, the Navy's is committed to reducing crew sizes on new classes of ships, and the nation wishes to reduce personnel by increased reliance on technology:

⁹⁶ Cost estimate provided by extrapolation from Navy public release of March 2000, <http://www.chinfo.navy.mil/navpalib/testimony/seapower/buch0302.txt> last accessed by author January 2003.

There should be a total-ship initiative to produce the significant manning reductions that are required. The goal should be a greater than 50 percent reduction, not only of ship manning, but also of the total infrastructure that supports the people on board ships. There are vast differences between Navy manning and its commercial counterparts. The Department of the Navy will have to adapt strategies from commercial practices using fewer but more experienced people to yield lower manning costs and higher readiness. Watch standing, damage control, maintenance and repair, and training all must be examined in light of the need to reduce personnel requirements." (National Research Council 1997, 6)

Technology's Impact on Navy's Culture

In evolutionary style high-tech became the goal of the Navy, and technology's impact on Navy culture has begun to reveal itself. Samuel P. Huntington presented in 1957, a well-defined and defended thesis that there was a necessary dichotomy between the norms and values of the common citizen and those necessary to be a combat-ready military person.⁹⁷ Morris Janowitz in 1960, in an equally important work on the military,⁹⁸ forecast the movement of the nation toward a military made of volunteers who were more socially representative of the nation's social and racial makeup. In 1973, Charles Moskos (1973b, 255-279) introduced some discrete terms when he suggested that military service would soon move from a "calling" to an "occupation":

Prior to the era of the all-volunteer force and attempts to equalize civilian and military compensation the economic disadvantages of military service were offset, in part, by fringe benefits, which were perceived as part of the compensation package of an implied contract. Among the latent functions of this pattern of compensation were support of military service as a calling rather than an occupation, maintenance of the military installation as a community, enhancement of the fraternal nature of military organization, legitimization of the military as a social institution, and the presence of symbolic incentives for the citizen to serve in the military and thus fulfill a right and responsibility of citizenship.

⁹⁷ Main arguments found in Chapters 6-11 of Samuel P. Huntington, *The Soldier and the State: The Theory and Politics of Civil-Military Relations*. Cambridge, MA: Harvard University Press, 1957.

⁹⁸ This argument found in Chapter 5 of Morris Janowitz, *The Professional Soldier: A Social and Political Portrait*. New York: The Free Press, 1960.

With the move toward equalization of military and civilian pay, changes in the structure of benefits have modified the terms of the implied contract. Now, the conditions of "working" as uniformed members of the armed forces increasingly resemble the employment conditions of civilian occupations. Whether by design, intuition, or accident, the makers of military personnel policy have sought to compete with commerce and industry for "workers" by making military employment similar to civilian employment. (Segal et al. 1979, 109)

As this study suggests, increased naval technology, came partly from the recognition that impending personnel shortages were an increased possibility in an all-volunteer force. In turn, greater technology has led serving military members to view themselves as professionals in an occupation. While technology has reduced the need for high numbers of people to deliver firepower, it is unforgiving in its requirement for properly educated sailors who can properly operate and maintain this new high-tech equipment.

This fundamental change in the make-up of the Navy places direct requirements on the personnel management system in which these high-tech operators exist. As more and more specialization is required, some traditional organizational structures such as "rank" as the criterion for leadership may need be replaced by "expertise" in performing a job. In the last three decades some lines between military and civilian societies have been completely erased, and most others are severely blurred. At first, the all-volunteer force was able to recruit adequate numbers of personnel because of a severe national economic downturn (in 1973-74). During the late 1970's the nation and the military made some major personnel policy changes that opened formerly closed ratings to minorities and women, so that the shortage was eased, although not eliminated. The buildup of the Navy toward a 600 ship goal in the 1980's also occurred during times of national high unemployment and while demographically young manpower was still on the rise. The fall

of the Berlin Wall and the peace dividend that followed allowed the military in the 1990's to downsize and avoid across-the-board recruitment and retention problems. Thus, if one looks solely at the numbers of military recruited, it is possible to conclude that the incentive system suggested by economic models has been successful to date. Unfortunately, a "don't fix it" attitude also suggests that recruitment and retention of "any person" not the "right person" is acceptable. The 21st century Navy needs to ensure that its smaller cadre of personnel serving in its operational units and ashore are not just "anyones" but are true professionals who can properly defend this nation's security and interests.

Are Econometric Models The Right Tool?

Beginning in the 1960's the Navy personnel management system was a groundbreaker in studying the effects of pay on recruitment and retention. Navy personnel studies were invaluable in convincing Congress that the Navy needed to maintain, first and foremost, a solid base of personnel that it could train and educate to maintain its effectiveness. The base of this force was mostly laborers with a high school education who were able to learn required job skills with elementary on-the-job training. This force, even in the mid-1980's, reacted favorably to the econometric incentives that were recommended in various studies. One traditional standard was that a one-percent raise in base pay yielded as much as a two to two and one-half percent increase in recruitment and retention rates.⁹⁹ Such success in managing the numbers by simple pay adjustments left a false sense of security in the management system and its modelers. The

⁹⁹ The Congressional Budget Office consistently used 2.5 and above elasticities for first-termers. See Appendix A Congressional Budget Office Report of September 1987 *Setting Personnel Strength Levels: Experience and Productivity in the Military*.

"aberrations" that occurred in the 1980's in "pilots" and "nuclear-trained officers and enlisted" were dismissed as special cases with no real reason to challenge the base econometric model. These pilot and nuclear-trained personnel shortages were "solved" by the introduction of incentive pays. But as the 1980's went on, more and more officer communities and enlisted ratings needed these extra pays. Bonuses were required for more and more reenlistments so that most officers today are eligible for bonuses during their careers.

In the late 1980's and through the 1990's modelers found that the effects of pay raises were being sharply reduced. This apparent drop prompted the Navy to request that CNA conduct a review on this issue. In a March 2002 report, CNA stated: "Our baseline model generates a pay elasticity estimate of 1.5; in other words, a 1-percent increase in pay is predicted to cause a 1.5 percent increase in reenlistment" (Hansen and Wenger 2002, 3). Even if that percentage increase were indisputable, this would show a sharp reduction from the 2.5 percent accepted in the 1980's. A detailed look at the CNA report shows two issues that need further review. First, the research showed:

(S)ome evidence that Sailors' responsiveness to pay was different during the drawdown period. ...

(W)e recommend incorporating data from future fiscal years in the model as they become available. It is likely that Sailors making reenlistment decisions are more similar to their contemporaries than to their predecessors. If so, inclusion of more recent data will only improve the ability of reenlistment models to forecast future reenlistment rates. (Ibid., 4-5)

This draw-down period included most of the 1990's, a period of large increases in high-tech enlistments. It is of concern that the Navy continues to believe in high pay elasticities to predict overall retention. As the force changes from mainly labor intensive rates to more high-tech occupations, the models will continue to over-predict retention

because they will include historical behavior of times when the Navy had greater levels of unskilled labor. For example, if labor intensive personnel have a pay elasticity of 3.0 and high-tech people have a elasticity of 0.5, a total Navy elasticity would fall somewhere between. It is suggested that the current fall from 2.5 of the 1980's to the current 1.5 estimate is just such an indication. The second issue to highlight is the Hansen study's findings on elasticity differences by rating:

...(T)his approach suggests that individuals in different occupations do respond differently to changes in compensation. ...

Estimates of the pay elasticity of reenlistment range from 0.2 (Cryptology) to 3.8 (Ship Maintenance)... The implication is that estimates of the pay elasticity of reenlistment are extremely sensitive to the choice of ratings being studied in the analysis. (Ibid., 34-35)

Table 10 displays some occupational elasticities which allow for key comparisons. It reveals that overwhelmingly high-tech occupations were found to have lower elasticities than the overall 1.5 that the Navy has recently decided to use in its models, while labor intensive occupations generally were shown to have higher elasticities than the 1.5 selected. A conclusion would be that a 1.0 base pay increase, may gain the Navy an overall 1.5 increase in reenlistment, but it will most likely gain a lot more labor intensive workers and a lot less high-tech workers than such a common number suggests. In a different report Hansen also notes:

Other potential contributors to manning shortfalls include unexecutable billet structures, incorrect requirements, imbalances during the drawdown and historical inventories. Rather, this analysis underscores the notion that measures of the pay gap are not sufficient in determining whether military compensation is "too high" or "too low". (Hansen, 2000, p. 27)

Table 10: Pay Effects - Occupation-Specific Elasticities

Rating/Occupation	Pay Elasticity
Marine Engineering	2.8
Ship Maintenance	3.8
Aviation Maintenance	0.7
Aviation Ground Support	0.5
Media	1.9
Logistics	3.3
Administration	3.1
Data Systems	1.5
General Seamanship	3.2
Health Care	2.6
Cryptology	0.2
Ordnance Systems	0.3
Communications/Sensor	2.0
Weapons System/Control	1.3

Source: Michael L. Hansen and Jennie W. Wenger, *Why Do Pay Elasticity Estimates Differ?* (Alexandria, VA: Center for Naval Analyses, CRM D0005644.A2, 2002) 34, table 7.

A recent briefing report from the U. S. General Accounting Office (GAO) examined "retention critical specialties" of the services including the Navy. (GAO 2001b, 22-3) The Navy provided GAO with a list of its occupations in which it felt it had significant shortfalls. (Shown in Table 11.) The Navy is very concerned about specialties that are already receiving substantial reenlistment bonuses and yet have been experiencing low reenlistment ratios since the 1990's. After looking specifically at these same occupations in a 2000 study, CNA investigators concluded that all problems in rating shortages are not directly related to pay:

Table 11: Navy Retention Critical Specialties by Priority

Priority	Navy Rating Navy Enlisted Code	Occupational Title
1.	33xx	Nuclear propulsion plant operators and supervisors
2.	17xx (EW) and 78xx (AW)	Electronic warfare technicians and systems operators
3.	92xx (CTI) and 91xx (CTR)	Cryptologic technicians
4.	11xx (FC) and 13xx (FT)	Fire Controlmen
5.	04xx (STG) and (STS)	Sonar Technicians
6.	14xx, 15xx (ET), 66xx and 79xx	Electronics technicians
7.	69xx (AC)	Air Traffic Control
8.	53xx	Divers
9.	47xx (IC)	Interior communications
10.	AME	Aviation structural mechanics -safety equipment

Source: General Accounting Office (GAO), Report to the U.S. House of Representatives, Committee on Armed Services, Subcommittee on Military Personnel, Chairman and Ranking Minority Member, *Military Personnel: Perceptions of Retention-Critical Personnel Are Similar to Those of Other Enlisted Personnel* (Washington, D.C.: GAO-01-785, June 2001b) 23, table 7.

This CNA study and other recent econometric studies have found that addressing these critical rating shortfalls, in the light of the low pay elasticities demonstrated, would mean that tremendous pay raises would have to be offered if pay were the only solution to a critical occupation's shortfall. Military personnel cost is already a high percentage of

the total military budget even though the numbers of active duty and reserve personnel have dropped over the last decade.

While total numbers of personnel have dropped by one-third, the percentage of DOD's budget spent on personnel has only declined by a few percentage points.¹⁰⁰ In his book Augustine's Laws, Norman Augustine introduced the idea that high-technology military hardware has a staggering cost-growth curve that greatly outpaces both the defense budget and the gross national product of the United States. His tongue-in-cheek prediction of a force planning disaster is summarized in Augustine's law number 16. "In the year 2054, the entire defense budget will purchase just one aircraft. This aircraft will have to be shared by the Air Force and Navy 3 1/2 days each week except for leap year, when it will be made available to the Marines for the extra day" (Augustine 1986, 111). A similar dire prediction could apply to personnel if the only solution to low retention is pay. In that case, paying exorbitantly for people would leave insufficient monies for their equipment:

In principle, one can use our estimates of the relationship between changes in military compensation and changes in reenlistment to estimate the changes in compensation necessary to eliminate manning shortfalls. Given the low estimated pay elasticities, however, we focus on the general implications of our estimation rather than specifically calculate increases in compensation.

Our analysis suggests that the current levels of compensation are *not sufficient* to address the manning problems faced by these highly technical ratings. In other words, greater flexibility in military compensation would help to alleviate manning shortfalls. (Hansen 2000, 49, emphasis in original)

Navy manpower managers have begun to notice that strict reliance on the suggestions of their econometric models are untenable. The levels of compensation that

¹⁰⁰ Between 1989 and 1999 the total yearly budget expenditure on "Military Personnel" has declined approximately 33% from 109 billion to 73 billion while sheer numbers of active duty military personnel have declined 35% from 2.1 million to 1.3 million. In 1989 the budget category "Military Personnel" was 28% of total authority, in 1999 this percentage had dropped to 25% (CBO 2000, www).

would be required to solve personnel shortfalls, especially in occupations with predicted low retention rates, are simply not in the Navy's budget. Suggesting that the Navy's personnel budget will need to increase while the numbers of sailors on ships is being reduced is also not politically acceptable. Yet, because the modeler finds non-pecuniary issues too hard to quantify and model, planners now have turned to creative compensation strategies. These compensation strategies suggest non-pyramid shapes for billets and personnel while suggesting skill-based pay systems that further modify the Navy cultural ideas of rank and leadership.

The following summary was presented in a 1999 CNA study addressing technological change in the Navy and its inevitable required change in personnel policy:

Technological change, coupled with changes in civilian labor markets, will have the following implications for Navy personnel policy:

- Manpower requirements will no longer be pyramids.
 - Routine tasks will increasingly be automated, lowering junior paygrade requirements.
 - Skilled technicians will make up an increasing proportion of the force, requiring either more middle paygrade requirements or a skill-based pay system.
 - Allowing full careers without moving into supervisory ranks will require changes to up-or-out policies and increases in pay not tied to increased rank.
- Recruiting
 - Increased use will be made of recruits from less than 4-year institutions.
 - Accomplishing this will require higher compensation, either through lateral entry or pay increases not tied to rank.
- Training
 - Future sailors will increasingly be generalists rather than specialists and will require education rather than Navy-specific training.
 - Technological advances will mean better embedded training so that more training can be done in operational units. With reduced manning, however, this may require additional training personnel.
 - The loss of apprenticeship tours will require different means of acquiring Navy-specific skills and different methods of funding this training.
 - To accommodate greater generalization, rapidly changing technology, and new acquisition processes, major changes may be necessary in the Navy's training development process.

- Skill vs. rank: New manpower requirements may necessitate a clearer distinction between skill and rank in setting recruiting, training and compensation policies.
- Compensation
 - Average manpower costs will increase as the Navy's workforce includes a higher proportion of skilled technical workers.
 - Existing pay systems don't support the need to set compensation levels in order to attract and retain workers with high-paying civilian alternatives.
 - A skill-based pay system, or some other method of separating pay from rank, should be considered.
 - Retirement incentives should be changed to retain skilled technical workers during their most productive years. (Koopman and Golding 1999, 79-80)

This CNA study recognizes that cultural changes are in store for the Navy. It is especially in tune with the training and education needs of the 21st century sailor, however, its recommendations rely on the theory that this new sailor will be mainly economically driven. So far, after examining the interrelationship between technology and humanities, this dissertation has shown how today's demand for high-tech sailors evolved. It has also described how manpower models of the 1970's were developed during the shift to an All-Volunteer Force and how they were combined into complex systems during the 1980's. Since the models were based on recruitment and retention needs in mainly labor intensive occupations, the entire Navy's personnel management system has been created to rely heavily on economic models.

In Chapter Five quantitative analysis will be used to investigate whether current high-tech sailors will respond to these economic determinates in the same manner as labor intensive occupations. If analysis shows little or no difference in the recruitment and retention preferences of high-tech and labor intensive sailors, then it can be expected that economically based personnel management systems will be effective in the future. If, however, analysis concludes that new management practices are required to properly

manage this emerging professional sailor, then changes in the Navy management will need to be implemented.

CHAPTER FIVE

ANALYSIS

DOD Survey

This study examines for quantitative analysis purposes the "1999 Survey of Active Duty Personnel" (Defense Manpower Data Center 2001) conducted by the Department of Defense. The survey was constructed around a core of questions broadly grouped into seven categories: Assignment Information, Career Information, Military Life, Programs and Services, Family Information, Economic Issues, and Background Information. The survey itself was a 20-page, 112-item survey instrument. (The complete survey is included as Appendix One following this chapter.) The population of interest for the survey consisted of Army, Navy, Marine Corps, Air Force, and Coast Guard active-duty members, below the rank of Admiral or General, with at least six months of active-duty service when the surveys were first mailed (total eligible 1,303,750). The sample consisted of 66,040 members. Respondents returned 33,189 usable surveys by the end of data collection. The Navy portion, used in this analysis, was 337,117 eligible personnel with 13,974 surveys mailed and 6,786 (48.6%) usable responses collected.

The Defense Manpower Documentation Center's (DMDC) Active Duty Master File¹⁰¹ for May 1999 provided the sampling frame. Then a non-proportional stratified,

¹⁰¹ The Active Duty Master File, constructed monthly contains basic information on all service members. This allowed people to be selected for the survey in a properly random manner.

single stage random sampling technique was used to select the survey sample. An introductory letter was sent in August 1999. After surveys were mailed in September 1999, up to four follow-up letters were sent stressing the importance of the survey. The collection of surveys concluded on 4 January 4, 2000 at which time all surveys received by that date were eligible to be used.

The Military Life portion of the survey focused on 37 components¹⁰² of military life, such as basic pay, military housing and job security. For each component, respondents were asked to select one of five possible choices: (Very satisfied, Satisfied, Neither satisfied nor dissatisfied, Dissatisfied, Very dissatisfied). When dealing with all responses,(or even a large portion like an entire service's answers to any one item), responses are often grouped into tow large categories: (1) those who were "Very satisfied/Satisfied" (VSS) and (2) those who were "Dissatisfied/Very dissatisfied" (DVD), while the neutral category of "Neither satisfied nor dissatisfied" is largely ignored.

The response of a large group is rarely of much value to policy makers because large groups such as "all occupations and all pay levels of all services" usually mask any subgroup differences. Without subgroup responses to analyze, the researcher is unlikely to identify specific problems that personnel management can address to meet individual needs. In short, in-depth analysis is required to help prevent the military's making "one-size-fits-all" policies. With this caution, Table 12 is presented to show some of these general "overview" findings. A "Navy only" column is included. Here even breaking the survey down one level by showing a whole service category's responses reveals some significant differences between a subgroup and the whole. For example, more Navy

¹⁰² Appendix One is a reproduction of the entire survey, question 39 provides a list of all 37 areas.

members said that they were "Very satisfied or Satisfied" in non-pay retirement benefits (e.g., medical care and use of base services) than revealed in total numbers. Navy personnel were also more satisfied with job security than the whole of respondents. The opposite was true in two areas; "Military values, lifestyle, and tradition" and "Chances for future advancement", where sailors were less satisfied than total DOD figures.

Table 12: Sample Findings of the 1999 DOD Survey (All Respondents)

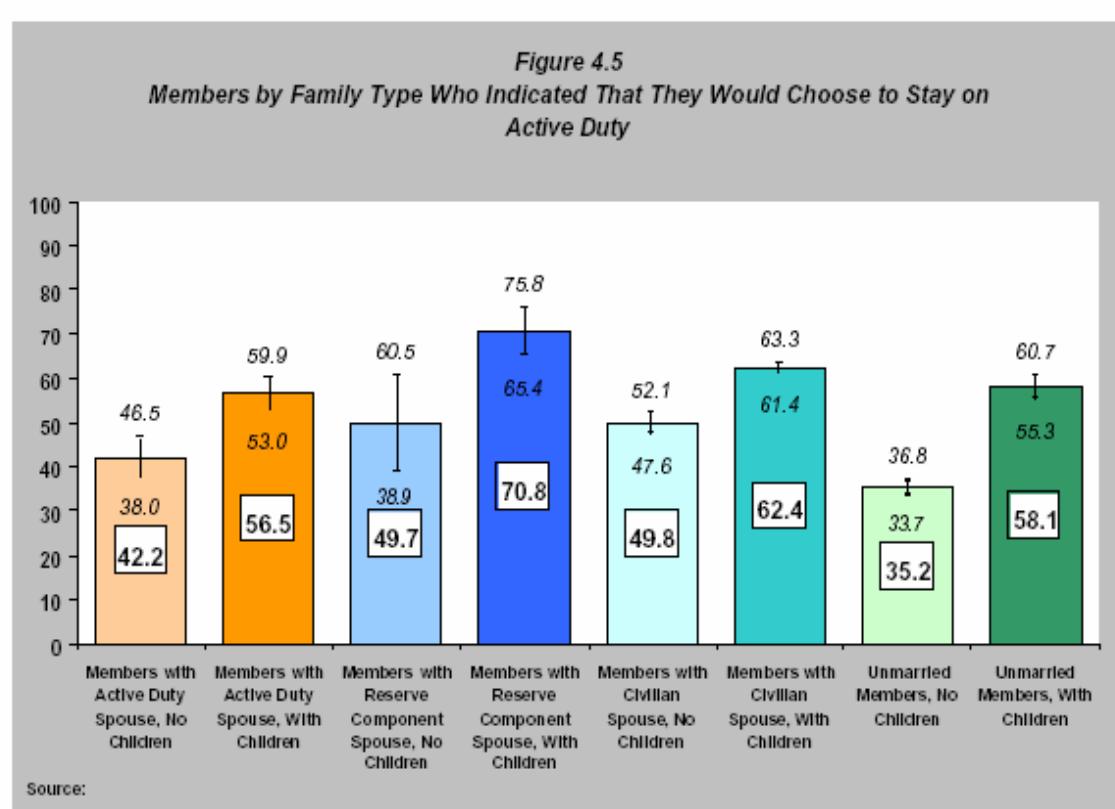
Category or question examined by the survey	All DOD Very Satisfied Or Satisfied	Navy Only (VSS)
Job Security	71.6%	76.0%
Dental care for the service member	61.8%	63.2%
Dental care for the families	35.6%	40.3%
Cost of living adjustments	12.8%	12.9%
Retirement pay	18.1%	17.6%
Medical care for the service member	52.1%	54.8%
Medical care for the family	39.5%	44.6%
Base Pay	22.7%	23.3%
Types of assignments received	50.3%	50.9%
Chances for future advancement	38.3%	33.6%
Your unit's morale	30.7%	30.0%
Your personal workload	40.5%	41.1%
Training and professional development	50.2%	49.7%
Off duty educational opportunities	44.5%	47.2%
Military values, lifestyle, and tradition	49.1%	43.7%
Military family support programs	37.2%	36.9%
Acceptable and affordable childcare	20.7%	22.4%
Amount of enjoyment from your job	44.1%	42.6%

Source: Defense Manpower Data Center, *Overview of the 1999 Survey of Active Duty Personnel* (Arlington, VA: DMDC Report No. 2000-008, February 2001) 21-27, tables 3.2-3.6.

The DOD survey is a very useful instrument when it is properly analyzed. The responses to its items for choice come from actual women and men serving their country

who have first-hand experiences of how the military treats them on a day-to-day basis. Rarely will an "overview" treatment of survey data show policy makers needed details. The most dangerous possibility is that these "overviews" can lead upper management or political pundits to wrong conclusions. As an example Table 13, which is a duplication of Figure 4.5 (Defense Manpower Documentation Center 2000, 63) of DMDC's "overview" report. This table compares "Members by Family Type Who Indicated That They Would Choose to Stay on Active Duty."

Table 13: Members by Family Type Who Indicated That They Would Choose to Stay on Active Duty

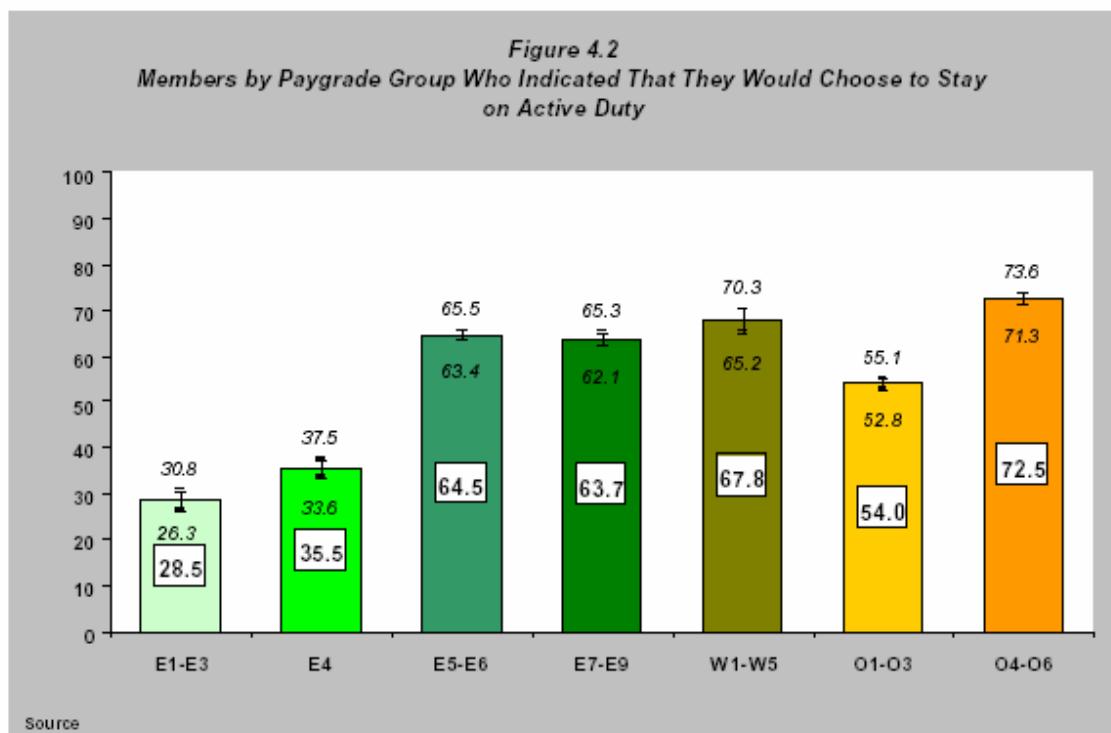


Source: Defense Manpower Data Center, *Overview of the 1999 Survey of Active Duty Personnel* (Arlington, VA: DMDC Report No. 2000-008, February 2001) 63, figure 4.5.

Simply looking at this table and concentrating on the percentage of respondents who were "very likely/likely" to stay in the military, might cause the viewer to conclude initially: "Since all categories of persons examined are more likely to stay in the military when they have children, we should recruit more servicemembers who would enter with children."

Another slice of the same intention to reenlist item¹⁰³ is shown in Table 14.

Table 14: Members by Paygrade Group Who Indicated That They Would Choose to Stay on Active Duty.



Source: Defense Manpower Data Center, *Overview of the 1999 Survey of Active Duty Personnel* (Arlington, VA: DMDC Report No. 2000-008, February 2001) 60, figure 4.2.

¹⁰³ Question 32 of the survey states: "Suppose that you have to decide whether to stay on active duty. Assuming you could stay, how likely is it that you would choose to do so?"

This summary is Figure 4.2 of the same DMDC report (*Ibid.*, 60). It examines "Members by Paygrade Group Who Indicated That They Would Choose to Stay on Active Duty". This chart reveals another factor weighing on the retention decision, a member's pay grade, which in itself is related to time served. It is clear that more senior personnel have a greater propensity to stay in the service. Since members in higher pay grades are generally older, one might also expect that they are more likely to have children, than those newer to the service.

In another item¹⁰⁴ the survey asked military members about specific financial problems they had experienced in the last twelve months. In every category of personnel displayed in Table 13 (i.e., Members with Active Duty Souse, Members with Reserve Component Spouse, Members with Civilian Spouse, and Unmarried Members) those with children experienced more financial difficulties than those without. In nine of 14 possible financial trouble areas, the bottom three enlisted paygrade respondents had significantly higher responses than the average (DMDC 2000, 100-101). By employing some deeper analysis of the retention issue, it is possible to now overturn the initial conclusion that recruiting people just because they have children is a wise criterion.

Unfortunately, it seems that little detailed analysis has been performed on the 1999 survey. Research may have been slowed by the fact that to date DMDC has released only the "public version" of the data. Researchers would prefer the "confidential" files which contain original responses rather than dealing with the partially recoded version that DMDC has provided. The confidential files contain some very specific data on

¹⁰⁴ Question 96 in the survey states: "In the past 12 months, did any of the following happen to you (and your spouse)? (MARK ALL THAT APPLY)." It then list 14 possible examples of things to indicate financial troubles (e.g., Had a bill collector call your unit leader? Had a car, household appliances, or furniture repossessed? etc.)

occupations and pay grades that would have allowed a more precise statistical examination in this study. It is hoped that these findings refocus attention on this DOD survey and that DMDC will provide future researchers access to necessary data.

Another deterrent to more complete analysis may be the result of some initial reports released by GAO that were conducted at the "overview" level. The first report released in March of 2000 was entitled, "Military Personnel: Preliminary Results of DOD's 1999 Survey of Active Duty Members" (GAO 2000b). This report concluded:

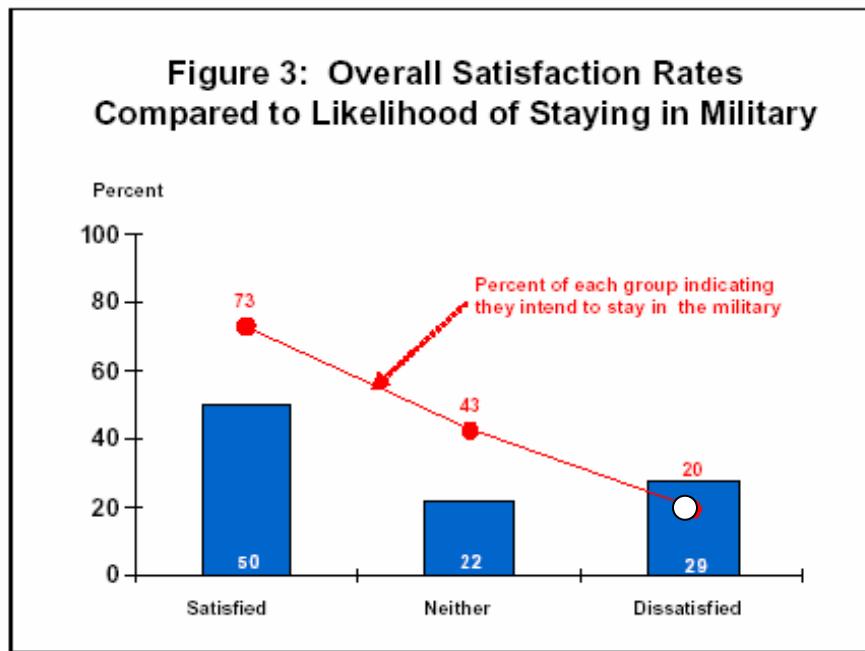
Before discussing the details of our analysis, it is important to talk about how aspects of military life interact to form a decision to stay in or leave the military. That decision is complex and highly personal. Servicemembers use their own experiences and perceptions to answer one simple-sounding question: Would I be better off if I stayed in or left the military? If they have or are planning a family, they also consider their well being in the decision. The military's ability to retain personnel relies on the summation of all these personal decisions.

The decision is not simply monetary, though money and overall compensation are important. Compensation is within the control of the government; Congress and the President can give the military a pay raise or sweeten retirement or other benefits, as they did last year. However, other factors, such as the strength of the national economy, have a profound impact. Better-paying jobs, less time away from home, or a more stable lifestyle, may also lure military members to civilian life. (GAO 2000b, 2)

This GAO report made all its conclusions at this overview level. Table 15 shows one of the conclusions of the report: "Satisfaction with military life and intent to stay in the military are strongly linked."

This kind of sweeping generalization, which most would even call intuitive, hardly spurs in-depth research by others. Since the last survey was not collected until January 4, 2000 and this report was given to Congress on March 8, 2000, it can be presumed that some "political pressure" may have been exerted on GAO to produce some results quickly. This report, because of time constraints, was limited in its depth of analysis.

Table 15: Overall Satisfaction Rates Compared to Likelihood of Staying in the Military



Source: General Accounting Office (GAO), Testimony before the U.S. House of Representatives Committee on Armed Services, Subcommittee on Military Personnel, *Military Personnel: Preliminary Results of DOD's 1999 Survey of Active Duty Members*. (Washington, D.C.: GAO/T-NSIAD-00-110, March 8, 2000b) 6, figure 3.

However, the GAO report of June 28, 2001, approximately 18 months after data collection was complete, does not appear to have used this extended time to apply adequate statistical rigor and come to any remarkable conclusions. The GAO report entitled "Military Personnel: Perceptions of Retention-Critical Personnel Are Similar to Those of Other Enlisted Personnel" (GAO 2001b) presents its methodology as follow:

We performed our work between September 2000 and June 2001 in accordance with generally accepted government auditing standards....

Our objective in assessing retention-critical occupations was to determine if there were any significant differences between the response of retention-critical enlisted personnel and other enlisted personnel. We defined a significant and

meaningful difference as a ± 7 percent difference between the responses of retention-critical personnel and other enlisted personnel. (GAO 2001b, 16)

Two problems are apparent in this methodology that GAO applied. The first issue of concern was GAO's decision to apply "auditing standards" to the data rather than using accepted statistical analysis procedures. Secondly, there is no explanation of what makes ± 7 percent difference between groups "a significant and meaningful difference."

Before doing its analysis and report, GAO asked each of the services to provide a list of their top ten "retention-critical" categories of personnel.¹⁰⁵ Despite such specificity by all services, GAO ended up lumping all services' "retention-critical" personnel into three groups which they labeled "electrical and mechanical equipment repairers," "communications and intelligence specialists," and "electronic equipment repairers." Such broad categories including personnel from all services makes it difficult to find differences. Another major problem of this methodology was that, in examining each retention-critical group, GAO compared its responses to "all other enlisted personnel," including the other two retention-critical groups. Thus, it was highly unlikely that any one group would stand out when other retention-critical groups were masking the differences. With such analysis procedures the expected result was reported by GAO as follows: "The experiences of retention-critical personnel varied somewhat by occupation area, but overall, they were generally similar to the experiences of other enlisted personnel" (GAO 2001b, 7).

Regression Analysis of Sailors' Responses

The intent of this study was not to replicate other studies which asked the question, "How will sailors as a whole group respond to ...?", Rather the question was:

¹⁰⁵ The Navy's categories are displayed earlier in Table 11 on page 203.

"Are there differences between high-tech and labor intensive cohorts of sailors in their perceptions of what they want from the Navy?"

Analyses performed by various researchers since the early 1980's¹⁰⁶ have established that there is a relationship between the dependent variable of "intention to remain in the military" and independent variables such as pay, health care, work hours, job satisfaction, etc. Starting with these past research findings, pair-wise comparisons in this study were made to determine whether there are differences in these linkages between high-tech and labor intensive personnel. The null-hypothesis tested was, "There are no significant differences between these groups." By this comparison's results, weight will be added to the judgment about continuing the current economic model of personnel management. Does the current system meet the needs of the nation in recruiting and retaining the right people, and is the current system appropriate to meet high-tech sailors' personal needs of professionalism? Drawing the correct answer to this question is required for the Navy to meet its 21st century personnel needs.

Analysis was conducted using standard statistical practices with emphasis on multiple regression analysis. Multiple regression is a general statistical technique through which one can analyze the relationship between a dependent or criterion variable and a set of independent or predictor variables. This analysis suggests that data derived can be used as an inferential tool by which the relationships in the larger population are evaluated from the examination of this random sample data. The results suggesting statistical significance were derived by comparing means through the technique

¹⁰⁶ One such analysis by Jean W. Fletcher and Kurt L Giesler was entitled, "Relating Attitudes Toward Navy Life To Reenlistment Decisions." They reported that sailors who were dissatisfied with quality of life factors had a decreased probability of reenlisting (Fletcher and Giesler 1981, 10). Table 14 on page 213 of this study continues to display the satisfaction and reenlistment intention link (GAO 2000b, 6).

"Analysis of Variance" (ANOVA), and the t-test comparison of two means. In the t-test, it is expected that if the two sample groups come from the same population, then their means, would be roughly equal. Some difference by chance is possible but large differences would occur rarely.

Under the null hypothesis we assume the means to be very similar. If the observed differences are large, we become more confident in differences in the groups. For this study, we put that probability of significance at the .02 level. If the means tested have even a two percent chance of showing commonality between personnel of high-tech and labor intensive occupations, then that category was labeled as no significant difference. Data was analyzed using the statistical package "SPSS 11.0 for Windows." The acronym SPSS originally meant "Statistical Package for the Social Sciences." It is now owned by "Statistical Product and Service Solutions," a Chicago-based software company that has kept the SPSS title.

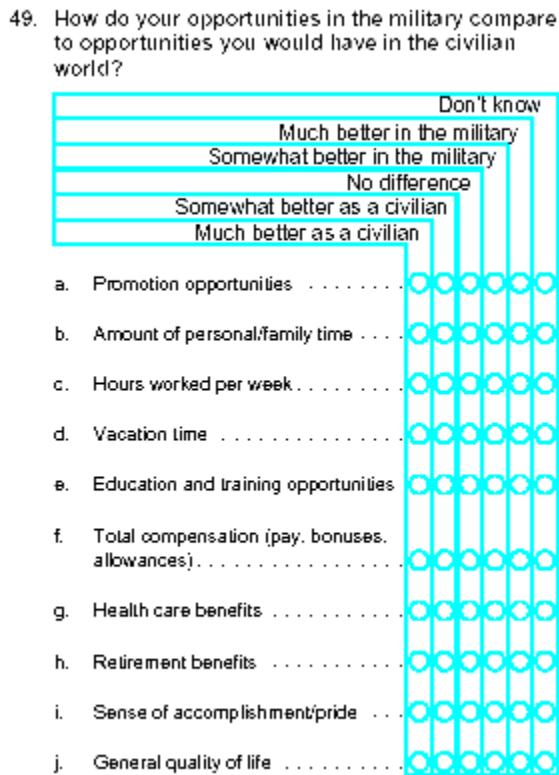
Table 16 displays the question to be examined as it appeared in the original survey, "How do your opportunities in the military compare to opportunities you would have in the civilian world?" The respondent was given six possible responses: "Don't know, Much better in the military, Somewhat better in the military, No Difference, Somewhat better as a civilian, or Much better as a civilian."

This question was chosen because the Navy must compete for personnel against this civilian world. The ten categories¹⁰⁷ examined by the survey question cover both compensation and non-pecuniary aspects in the same question. As described earlier, Navy occupations not actively pursued by civilian employers have higher retention

¹⁰⁷ Categories are: Promotion opportunities, Amount of personal/family time, Hours worked per week, Vacation time, Education and training opportunities, Total compensation (pay, bonuses, allowances), Health care benefits, Retirement benefits, Sense of accomplishment/pride, General quality of life.

figures than those occupations that are seeing high civilian demand. Additionally, by throwing out non-respondents and "Don't know" responses, this question's analysis allowed an accurate comparison of these two subgroups. When subgroups are compared across different questions, then variations will most likely occur between those who responded to question "x" and those who responded to question "y."

Table 16: How Do Your Opportunities in the Military Compare to Opportunities You Would Have in the Civilian World?



Source: Defense Manpower Data Center, *Overview of the 1999 Survey of Active Duty Personnel* (Arlington, VA: DMDC Report No. 2000-008, February 2001) 217, Appendix A.

In examining the data set, it was necessary to identify the coding used by DMDC for responses to the question. First, the question itself is identified in the data set as field "M9949". SPSS value labels were assigned by DMDC as follows: -99 Missing Skip of Series; -9 No Response; -8 Multiple Responses; -6 Not Applicable; -1 No Survey Return; .00 Not applicable; 1.0 Much better as a civilian; 2.0 Somewhat better as a civilian; 3.0 No difference; 4.0 Somewhat better in the military; 5.0 Much better in the military; and 99 Don't know. The next requirement was to eliminate surveys from those not in the Navy. This task was accomplished by examining survey question 108, "In what Service are you?" where 1 meant Army, 2 Navy, 3 Marine Corps, 4 Air Force, and 5 Coast Guard. Those personnel with a code of 2 (Navy) were studied. This step reduced the number of all surveyed servicemembers (66,040) from to a Navy only number of 13,974. Of the 13,974 surveys mailed, over 5,000 were not returned and some 2,000 were not usable even though they were returned, leaving the total usable Navy responses at 6,786.

This population of 13,974 Navy personnel still required further discrete identification. Since the question under consideration was chosen as a prudent means of identifying possible differences between high-tech and labor intensive workers, the next step taken was to ensure proper recognition of each surveyed person's occupational area. As previously discussed, some original key data are not available. DMDC in its public release version of the "1999 DOD Survey" has hidden actual occupations created a field labeled "Constructed Occupation Area," and identified its SPSS coding as "OCCAERA." This researcher's analysis would have been aided had the original rating data been available for research. Nevertheless, the categories provided in the recoding process did allow sufficient labeling of each responder into an occupational area that could be labeled

as "tech or non-tech." Table 17 displays the full breakout of these constructed occupation areas and how they were identified in this report by the addition of new code labeled "Tech Code" which is shown in column four of the table.

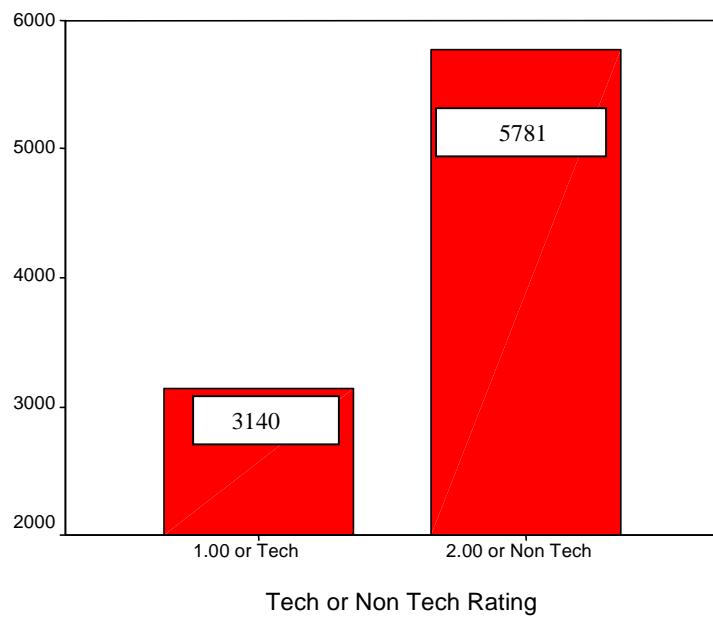
Table 17: Constructed Occupation Areas of Navy Surveyed Personnel

Constructed Occupation				
Occupation	Frequency	Percent	Tech Code	Cumulative Percent
Not Valid	822	5.9	NA	5.9
Infantry, Gun Crews	1355	9.7	E0	15.6
Seamanship				
Electronic Repairer	1066	7.6	E1	23.2
Communication Intelligence	1124	8.0	E2	31.3
Health Care	759	5.4	E3	36.7
Other Technical Allied	191	1.4	E4	38.0
Support & Admin	1096	7.8	E5	45.9
Electl/Mech Equipment	2405	17.2	E6	63.1
Craftsworker	485	3.5	E7	66.6
Service & Handler	438	3.1	E8	69.7
No Occupation	2	.0	E9	69.7
General Officers Executives,	177	1.3	O1	71.0
Tactical Officers	1192	8.5	O2	79.5
Intelligence	194	1.4	O3	80.9
Engineering Maintenance	936	6.7	O4	87.6
Scientists Professional	278	2.0	O5	89.6
Health Care	638	4.6	O6	94.2
Administrator	529	3.8	O7	97.9
Supply, & Allied	252	1.8	O8	99.7
No Occupation	35	.3	O9	100.0
Total	13974	100.0		

When all officers were removed from the calculation (5,053 personnel), 8,921 surveyed Navy enlisted remained. Personnel identified in Table 17 as being of "Tech Code" E1, E2, E3 or E4 were recoded at this point. The new code of 1 identified these high-tech personnel as "Tech." All other occupations were assigned a new code of 2, which identifies them as "Non Tech" ratings or occupations. Table 18 provides this breakout.

Slightly over 5,000 Navy enlisted personnel who sent surveys failed to return them although they received several mailed reminders. In addition, for any question some respondents invalidated their responses either by skipping that question or giving multiple responses where a single response was required.

Table 18 Tech or Non Tech Rating Identification of All Surveyed Navy Enlisted.



In order to make the final adjustments to the data set, those who did not respond to question 49 either because they did not return the survey, skipped that question, or provided multiple responses to an individual sub-question were eliminated. Table 19 displays the final number of Navy responses to each sub-question of question 49. Fortunately, despite the drop in total numbers due to non-returns and invalid answers, the ratio between tech and non tech personnel remained comparable to the original sample.

Table 19: Total Number of Valid Navy Responses for Each Sub-question of Question 49.

Question 49: How do your opportunities in the military compare to opportunities you would have in the civilian world?

Sub-question	Tech	Non-Tech	Total
49a. Promotion opportunities	1105	1904	3009
49b. Amount of personal/family time	1327	2268	3595
49c. Hours worked per week	1332	2283	3615
49d. Vacation Time	1312	2262	3574
49e. Education and training opportunities	1265	2168	3433
49f. Total Compensation (pay, bonuses, allowances)	1214	2112	3326
49g. Health Care Benefits	1217	2116	3333
49h. Retirement Benefits	1078	1882	2960
49i. Sense of accomplishment/pride	1260	2179	3439
49j. General quality of life	1266	2189	3455

The DOD survey gave the respondents several answers from which to select. To these were applied numerical values. "Tech" and "non-tech" were assigned a nominal number of 1 and 2 as an identification system with no assumption being assigned to the values. In the ordinal scale used each position has a unique position relative to the other categories but does not imply an equal interval.

Specifically, ordinal values were assigned as follows: 1.0 Much better as a civilian; 2.0 Somewhat better as a civilian; 3.0 No difference; 4.0 Somewhat better in the

military; 5.0 Much better in the military. With this value assignment it was possible to select appropriate statistical techniques and perform comparisons of means using t-tests, oneway ANOVA (ANalysis Of VAriance), and crosstabs including chi-square tests. Full statistical results are presented in Appendix Three. Table 20 displays ANOVA significance levels in the comparisons of means.

As noted, 1 was assigned to the answer "Much better as a civilian" and 5 was assigned to the category "Much better in the Military." Thus, a low number means respondents believe that the civilian world will treat them better in this category whereas a high number would suggest that the sailor thought the Navy was better in this area than civilian life.

Table 20: Calculated Means and ANOVA Significance level, for Each Sub-question of Question 49.

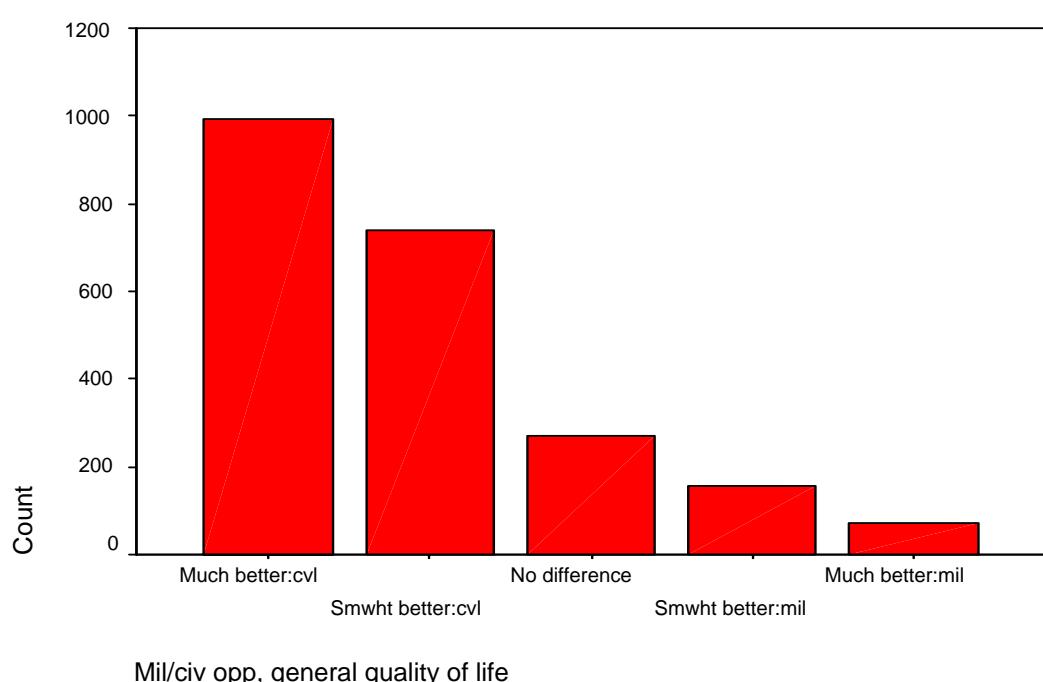
Sub-question	Tech Mean	Non Tech Mean	ANOVA Sig. Lev.
49a. Promotion opportunities	2.2751	2.3461	.103
49b. Amount of personal/family time	1.6292	1.5780	.094
49c. Hours worked per week	2.0781	1.8997	.000
49d. Vacation Time	3.7721	3.6118	.000
49e. Education and training opportunities	3.2261	3.3699	.002
49f. Total Compensation (pay, bonuses, allowances)	1.9308	2.1548	.000
49g. Health Care Benefits	3.3443	3.3696	.597
49h. Retirement Benefits	2.7208	2.9841	.000
49i. Sense of accomplishment/pride	3.1183	3.1193	.981
49j. General quality of life	1.0253	1.1171	.017

Four of the ten areas examined in question 49 showed no significant difference between the responses of high-tech and labor intensive sailors. These were the areas of no significant difference: "Promotion opportunities," "Amount of personal/family time,"

"Health care benefits," and "Sense of accomplishment/pride." In "Hours worked per week" and "Vacation time," labor intensive workers thought that they would get a better deal in the civilian market. Possible reasons for this higher level of discontent among labor intensive workers in these two categories is beyond the scope of this study.

In the remaining four categories: "Education and training opportunities," "Total compensation," "Retirement benefits," and "General quality of life," the high-tech sailor believed that the military option was significantly lower than civilian market opportunity. Additionally, in quality of life, neither high-tech nor labor intensive sailors thought that the Navy was competitive with the civilian world. Table 21 shows frequencies of all sailors' responses to this question.

Table 21: Responses of All Sailors to Question 49j "How do your opportunities in the military compare to opportunities you would have in the civilian world?" for the Category of "General quality of life".



General quality of life. Of all the areas examined in this survey question, sailors discontent with "Quality of Life" (QOL) issues is strongest, and high-tech sailors are significantly even less satisfied than the rest. Consequently, the Navy needs to examine this issue fully and to heed the following recommendation of the National Research Council:

Just as it is critical for a unit leader to maintain a watch on the health, morale and well-being of his or her sailors or marines, so also in a broader sense must military organizations be cognizant of the QOL (Quality of Life) of their members. QOL research provides the basis for an assessment of the fabric of the organization and the information required for important investment decisions that will affect the organization's future. QOL research must help guide decisions about overall allocation of resources--that is, the tradeoffs between alternative QOL programs, and tradeoffs between QOL programs and other investments in people, equipment, research, and technology, and even in the organizations ability to carry out operational activities. Currently, we do not know whether a dollar spent on housing programs improves retention more than the same dollar spent on exchanges. We know even less about whether either of these quality-of-life expenditures improves fighting effectiveness more than an extra steaming day per quarter per ship. To support informed decision making, future research needs to improve in three basic areas: providing mechanisms for obtaining better and more timely data; developing linkages between QOL program efficacy and valid measures of performance; and establishing a broader approach to our understanding of the concept of quality of life. (National Research Council 1997, 79-80)

Total compensation. As shown in this analysis, high-tech personnel are interested in pay issues and perceive an even wider military-civilian pay gap than do their labor intensive counterparts. But since the military is well focused on this issue, plans are in place to gradually correct base pay issues. Efforts must continue in the Navy to eliminate both base pay gaps and "out-of-pocket" expenses associated with assignment to high cost areas. The survey's pay response average was concentrated around the "Somewhat better as a civilian." Moreover, personal interviews with high-tech sailors conclude that most

see that the Navy is working in a measured manner in the pay area. Here are the conclusions of a 2001 RAND study on enlisted pay:

Although no wholesale restructuring of the military's compensation system has been undertaken since World War II, there have been changes in the system in the past two decades that have tended to reduce the role of retired pay and to increase the role of basic pay while increasing the degree of graduation. Thus, these changes have been in the right direction. (Asch, Hosek, and Warner 2001, 53)

Retirement benefits. Although retirement was identified as an area of separation between high-tech and labor intensive workers. The mean responses of personnel to the retirement issue show the average as only slightly less than the "No difference" between military and civilian opportunities level. In the matter of retirement John Warner and Beth Asch provide this insight into the retirement area:

At some point the military wants everyone, including the best personnel, to separate, even when they may still be individually very productive. The longer individuals remain in the top positions the slower will be the promotion rates for younger (and potentially equally able) personnel. Unless offset by changes in the structure of pay, reduced promotion opportunities in the junior ranks will discourage work effort in those ranks and will cause those junior personnel with the best external opportunities (i.e., the more able) to leave. Without the proper inducement, the senior personnel may not want to leave voluntarily if their military pay exceeds their best private sector alternatives. Such is especially likely to be the case for those trained in the military-specific skills. (Warner and Asch 1995, 385)

At this time, it appears that the Navy does not need to make any drastic changes to its retirement system. As a warning, however, it should be remembered that modelers predicted there would be little reaction by personnel to the retirement system changes implemented in 1986. The actuality was that servicemembers saw the changes as a "broken promise" and a "lack of respect" for the implied contract. Consequently, the Navy should continue its present course in supporting, as a minimum, current retirement benefits.

Education and training opportunities. The final area where high-tech sailors were significantly less satisfied than labor intensive personnel was in education and training opportunities. Unfortunately, this category combines two different areas in the same question. Training in the military is traditionally of high quality, and sailors getting training in the past are influenced in such questions to remember its value. This high quality training is the most likely source of this "mean" being above the "no difference" level. Education opportunities, on the other hand are severely limited, and high-tech sailors are somewhat frustrated in their chance to get degree-awarding academic opportunities.

In early 2001 the Navy set out to review formally the state of Navy training and education. This executive review of Navy training was presented in a report to the Chief of Naval Operations (CNO) on August 9, 2001 in a report entitled "Revolution in Training". As part of the review of training, the review board interviewed 202 sailors from 19 units and reported these interview findings.

The first series of questions we asked pertained to Sailors' expectations for training. In particular, we were interested in finding out whether Sailors' expectations for training and education were being met. Sailors told us that their expectations for training *were* generally being met, although we were dismayed to find that they had fairly low expectations for both training and education to begin with....

Sailors also reported several important obstacles to learning. Of these, lack of time was (by far) the reason most often cited for training and education being difficult or impossible to accomplish. In addition, Sailors told us that personnel shortages, inadequate facilities and equipment, and low priority by their commands were obstacles to learning. With respect to educational opportunities, Sailors reported that availability and access to courses were most in need of improvement. Several also commented that publicity for educational opportunities could be improved so that Sailors would know what was available. (CNO 2001, 20-21, emphasis in original)

Education opportunity and quality of life are two key areas in which the Navy must do better to recognize the professional nature of its 21st century high-tech sailors.

Investigations and Findings

This study was based on the desire to investigate the current state of Navy manpower management and further discover whether the 20th century management system is adequate to recruit and retain the type of sailors the Navy needs to operate in the 21st century. This section of the study will review those researchable questions and report the findings.

What effects did changing from a system of conscription to an All-Volunteer Force (AVF) have on manpower requirements in the Navy? Chapter Three, which began the investigation into this question, revealed matters of great interest. The American military up to the end of World War II consisted of a small standing force which was augmented in time of crisis by conscription. Military technology was generally at a level similar to that found in machinery at home, on the farm, and in the factory. At the end of World War II some national social norms began to change. Women became a more prominent part of the civilian work force, young people began to stay in secondary school and then enter college with greater regularity, and a larger standing military demanded constant conscription. By the time the 1970's arrived the nation both tired of inefficiencies in the conscription system and disenchanted with the Vietnam experience, demanded an All-Volunteer Force (AVF). To change to an AVF the military needed to raise its pay base, which had greatly underpaid conscripts. Additionally, now that the military was directly competing with civilian business for its work force, it began to identify and adopt accepted business practices. It was during this time that DOD began

earnestly to research manpower issues and to develop personnel management models. Procedures for requirements determination and early modeling systems are also presented in Chapter Three

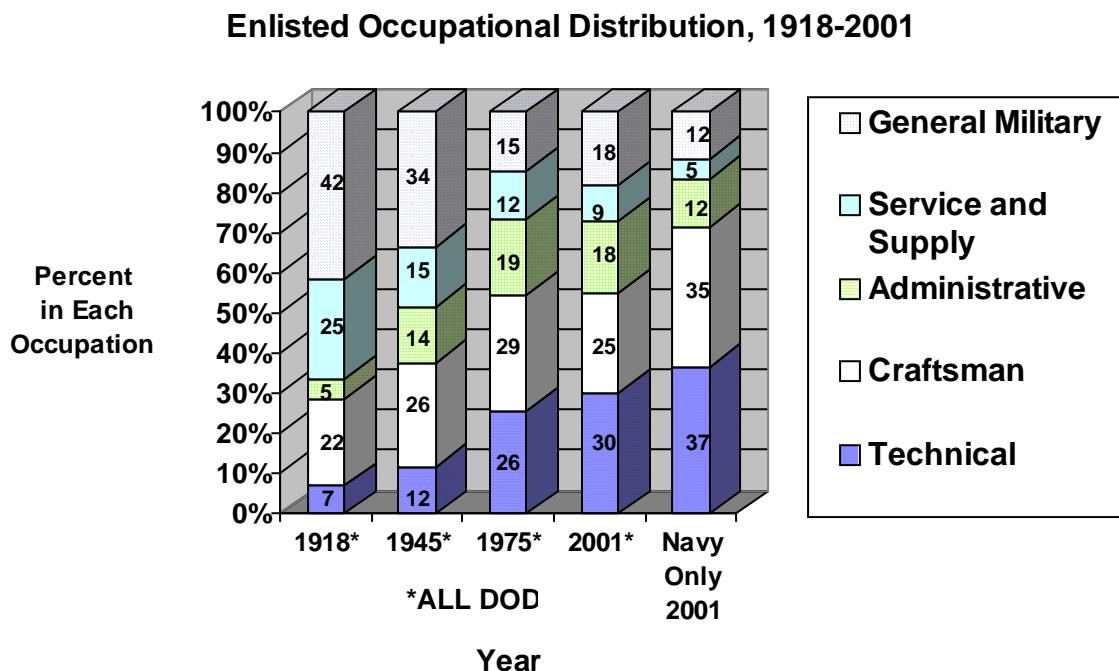
How did demographic issues of this time affect the Navy's decision to increase technology aboard its ships? When the military looked beyond the 1980's it foresaw a shrinking pool of male high school graduates while it moved toward implementing this new AVF. As part of its planning for this demographic change, the Navy began to design its ships with new technologies to reduce the amount of labor intensive work required on them. During the 1970's as great social strides were made in the nation's attitude toward minorities and women, the military became a leader in many areas of integration. The opening of opportunity to these workforce groups relieved the pressure of the male demographic dip, but it did not stop the Navy from its efforts to find ways of using technology to reduce its labor demands.

Has the job skill requirement of the military, and the Navy in particular, changed over these last few decades? Table 22, clearly presents that the percentage of needed high-tech military workers increased and the number of labor intensive workers (i.e. "General Military" and "Service and Supply") decreased. The final column shows that the Navy is more highly dependent upon technical workers than suggested by the DOD percentages.

Of additional concern is the fact that the percentages of high-tech personnel requirements have risen historically, and no indication suggests that the ever-increasing demand for high-tech workers will end over the next few decades. The Navy is currently

designing ships, expected to be operating within the next twenty years, that will have upwards of seventy-five percent high-tech personnel serving on board.

Table 22 Enlisted Occupational Distribution, 1918-2001



Source: Graph constructed from various data reported in Harry J. Thie, and Jefferson P. Marquis, *The Present Military Personnel Management Framework: Where It Came From* (Santa Monica, CA; RAND, PM-1247-OSD, 2001) 14-15.

While it is highly unlikely that technology will eliminate all requirements for labor intensive workers over the next few decades, much work currently labeled as "Craftsmen" or the supply part of "Service and Supply" have had or will probably also experience technological advances to make them nearly indistinguishable from those currently labeled high-tech. (In this study the categories "Craftsmen," "Service and Supply," and "Administrative" are not included in the high-tech category.)

What are the causes of these changes? Besides the previously mentioned fact that the Navy purposefully set out to reduce labor intensive work on ships, its adopting technology was partially a product of technology's growth in the larger society in recent decades. Since World War II, the U.S. has relied on technology in the tools of war-fighting to make up for manpower imbalances that it has faced when compared to some competing nations. This shift was especially true during the Cold War. Although the Soviet Union's threat disappeared with its dissolution, in 1991, the United States has not lessened its resolve to lead technological capability for war-fighting in the 21st century. The United States desires to keep this edge in technology to reduce significantly casualties should the use of the military become unavoidable.

What were the manpower management policies and resulting manpower models of the 1970's and 1980's? Chapter Four was an in-depth examination of this question. Economic models were appropriately developed during the 1970's to examine the pay issues of moving from a force built on conscription to one of volunteers. The requirements pyramid was constructed with the expectation of recruiting labor intensive workers who would have high turnover at the end of their initial term of enlistment. To recruit such persons, focus was placed on compensation. Over time the simple models were combined to do more and more complex work, and manpower managers began to rely on their systems' output while hardly questioning at all of the model's underlying assumptions.

Since high-tech personnel will make up the largest portion of the Navy's 21st century work force, do high-tech workers require different management practices?

During the 1980's the Navy began to note that it was having trouble retaining sailors in

certain high-tech specialties. Its solution was to offer bonuses both to recruit and to retain personnel in shortfall areas. Salary and benefit increases to recruit or keep these sailors have continued steadily over the last two decades. (Appendix Two lists current available pays.) In the late 1990's, compensation models were investigated and stark elasticity differences were revealed between high-tech and labor intensive occupations. These studies revealed that if pay is the only means used to fix retention-critical shortfalls, then the Navy can expect an ever growing number of special pays and an ever expanding budget requirement for personnel.

Regarding sailors' perceptions of current Navy policies, analysis made at the beginning of this chapter showed significant differences in six of the ten areas examined between labor intensive and high-tech workers. In this study, a t-test comparison was made examining the differences of means between the two groups of "tech" and "non-tech" sailors in their responses to questions asked in the latest DOD survey. This "means" testing is a statistical result comparing differences to a chance expectation. A significance level of .02 was set; in other words, the study was willing to accept a two percent risk of being wrong. Since the means showed statistically significant differences the null hypothesis is rejected and the research concludes that there are differences between high-tech and labor intensive sailors.

Since the must he Navy recruit and retain high-tech personnel, initially attracting personnel with improved technical skills will greatly help. Later, in the recommendations section of this chapter, some suggestions will be presented. Once the Navy has recruited persons of high-tech aptitude, every effort should be made to retain these persons in whom has been made a large investment. To achieve this goal organizational changes

will be needed, especially recognizing the professional nature of the 21st century sailor.

Recommendations in this area will also be made later in this chapter.

What would cause the personnel management system not to not adopt this change in the personnel make-up of the force? Chapter One presented information on the interaction between technology and humans. It also explained how changing technology without the organizational adaptation to the new technology would mean that the organization-technology combination could never achieve its full promise. Although the kinds of technology used by military have definitely changed, the organization is reluctant to make proper some organizational changes to benefit fully. In other words, the manpower system is a technology that has not adapted to the change in human characteristics it was designed to interface with. As a result, its inefficiencies continue.. Technology brings specialization, which leads to diversity in the people employed. The Navy must accept this diversity of people and their needs, and to do so it has to abandon its one-size-fits-all approach to personnel issues. Navy leadership must be able to accept this change and its risks. This news report from *Aviation Week and Space Technology* of January 27, 2003, entitled "Promotion System Could Upset NCW," shows how deeply change can be resisted. An apt insight is the following:

Defense Secretary Donald H. Rumsfeld has made it clear he expects military leaders to carry out his goal of transforming the U.S. defense establishment. That means innovation and taking risks. But as one general confided, "I don't see any blocks on my (officer) effectiveness reports that say, 'Takes Risks and Innovates.' Until there are, nobody's going to stick his neck out too far. Remember, (Gen.) Billy Mitchell was an airpower innovator, but they court-martialed him." ¹⁰⁸

¹⁰⁸ Article entitled "Promotion System Could Upset NCW" written by William B. Scott found on page 59 of *Aviation Week & Space Technology* issue dated January 27, 2003. NCW stands for Network Centric Warfare.

Is it ethical to ignore the professional needs of high-tech sailors by relying on only compensation as the means of recruitment and retention?

The foundation of all morality is the experience of the value of persons and their environment. Every time you use moral language you are expressing your experience of the value of persons and/or their environment. If you say that hiding the defects of a used car is wrong, it is because you judge that in this matter persons are worth the truth. (Maguire and Farnoli 1991, 9)

Current practices rely heavily on economic models that have been effective in the labor-intensive management of earlier times, but most likely are inadequate to deal properly with the new high-tech population. Even if personnel management procedures can provide minimum numbers of sailors by means of a generous economic inducement, by returning to conscription, or even by relying upon other characteristics such as patriotism for recruitment and retention, ignoring high-tech sailors' personal needs of professionalism must be questioned ethically. With other management adjustments, could the Navy recruit better-suited sailors who would have higher personal satisfaction than those presently serving? In other words, if the Navy could fill its personnel requirements at a lower cost by making non-pecuniary management changes, would this change not benefit the entire nation as it allocates scarce resources?

Since the nation apparently does not desire to return to conscription or to solve military personnel issues through excessive compensation, new personnel management procedures will be required in the way high-tech sailors are recruited, trained, and employed on ships and ashore. The Navy's personnel management system needs further change to respond properly to the cultural shift of sailors, which is an unintended consequence of technological developments in the U.S. Navy.

Recommendations

Recommendations are provided to suggest ways in which the Navy organization could change to recognize more fully the needs of high-tech sailors. These recommendations are presented in three broad areas, Education, Quality of Life, and Career Management. As an informed commentator observed recently:

In a three-ring circus, sometimes the most interesting act is the sideshow. As Defense Secretary Donald Rumsfeld tries to tame the lions in the center ring that is his strategic review, Congress and the press have devoted most of their attention to high-priced, high-profile, high-technology weapons and to the sheer size of the military force. Although the soldiers, sailors, airmen and Marines who will actually wield those weapons and fill out those ranks do take first place on most priority lists in the defense community, discussion of personnel issues often amounts to little more than the slogan, "Give them more money," and then moves on.

But combat troops are not a commodity. The military's problems in recruiting people, retaining them and making the best use of their talents will not be solved by better pay and benefits alone, as welcome as the extra money may be. The future "transformed" military force that Rumsfeld envisions will not be manned by the same kind of people as those in uniform today, nor can that future force be managed in the same way it is today.¹⁰⁹

Education: The first major area of organizational change should be a fuller recognition of the high-tech sailor's focus on education.

All individuals inhabit a life-world, a total sphere of experience surrounded by a natural environment, man-made objects and other humans. People share a common stock of knowledge, but they cannot share experiences - especially the experience of a face-to-face encounter with another human. The fabric of culture then is made up of the subjective meanings individuals hold concerning the world in which they live.

The first perspective can be summed up in the proposition that society exists only as individuals are conscious of it, the second is the proposition that individual consciousness is socially determined. (Berger and Luckmann 1967, 78)

¹⁰⁹ From "Reforming the Ranks", by Sydney J. Freedberg Jr. found in the *National Journal* of August 4, 2001.

Roles are imposed on the individual by the culture. Knowledge is organized in categories of what is generally relevant and what is needed for a role. Although education gives the opportunity to change the job role, current military education practices do little if anything to modify existing social roles.

Education is severely underplayed in the Navy. Training is accorded to those who need job skills, but even here, the Navy often uses prior education as a prerequisite. If an individual has enough prior education to indicate that the desired training will be successfully conducted, then the Navy will train the sailor through a formal school. Rarely would the Navy consider the education of a sailor purely to increase that person's eligibility for possible future training.¹¹⁰ In civilian corporations, however, educational advancement is encouraged, adequate time is provided, and often full tuition is paid or reimbursed. A new educational approach would be for the Navy to look beyond its current education policies and to make a concentrated effort at using education as a means of improving its sailors' overall quality. Investing in sailors by providing courses, leading to an Associate's or technical degree, could go a long way in convincing individual sailors that the Navy was interested in a long-term relationship with them. Education is overwhelmingly important to 21st century sailors.

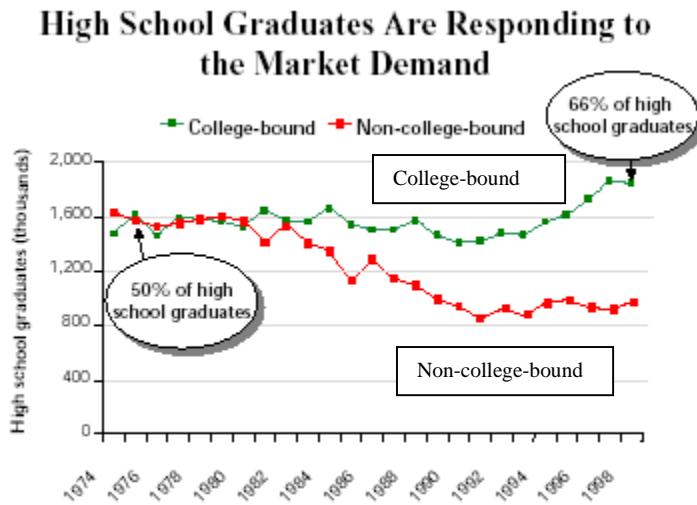
(A)ccording to the 1999 New Recruit Survey 91 percent of new recruits surveyed said that they want the Navy's help in achieving their education goals, which range from earning a GED (general equivalency diploma), to improving their ASVAB scores to qualify for another rating, to earning a college degree either on active duty or afterward. In fact, an overwhelming majority of new recruits plan to work toward a college degree during their enlistment, and 46 percent said that money for college was one of the top three reasons they joined the Navy. (Cymrot 2001, 37)¹¹¹

¹¹⁰ The exception to this rule in the Navy is that some enlisted personnel are selected for college programs to allow them to move from enlisted to officer.

¹¹¹ Peggy Golfin was in charge of this section of the report entitled: "Navy Enlisted Education".

Since higher education is the current route out of many gender, racial, ethnic societal constraints, more American youth, recognizing the economic benefits of it, are turning to education above the high school level as Table 23 shows:

Table 23: High School Graduates Going Directly to College 1974-1998



Source: Donald J. Cymrot, ed., *The CNO Briefings: Recruiting Issues, Navy Enlisted Education Policy, Quantity and Quality of Attrition, Compensation Strategy for the Future Force* (Alexandria, VA: Center for Naval Analyses, CAB D0003425.A1/Final, 2001) 34.

By classifying high school graduates as either "college-bound" or "not college" the Navy has limited its recruiting flexibility ". "College-bound" translates into people seeking a bachelor's degree, that is likely future officers, while those identified as "not college" are the probable recruitment base for enlisted personnel. About forty percent of high school graduates who choose two-year institutions are therefore not targeted for *either* officer or enlisted recruitment! Additionally, many of those currently labeled as "not college" would prefer a Navy program that educated them at some level below a

bachelor's degree. The Navy ignores persons entering the two-year institutions, and then continues to under-recruit them after they have successfully completed their degree. "In FY99, the Navy recruited only around 400 recruits with Associate degrees out of more than 555,000 graduates. To put this number in perspective, the Navy recruited more than 43,000 people with high school degrees in FY99 from a pool of 800,000 non-college-bound high school graduates" (Cymrot 2001, 44).¹¹²

Presently, Navy policy makers view sailors as either needing a traditional bachelor's degree or not needing higher education at all. Instead, the Navy should increase its efforts to recruit personnel at, or educate them to a two-year associate degree or technical school graduate level. Some current options are designed to get sailors ready for four-year institutions. For example, Broadened Opportunity for Officer Selection and Training (BOOST) is a program designed to get enlisted personnel ready for Navy Reserved Officer Training Corps (NROTC) programs and the Naval Academy Prep School is designed to get recent high school grads ready to enter the Naval Academy. The Navy should institute similar programs that would educate students needing only a two-year degree. This managerial move would have high benefits.

The Navy needs to be proactive by not just accepting its recruits and their cultural norms, but instead, helping to shape the future of its citizen-sailors:

Competition in the civilian labor market for more-skilled workers has increased demand for workers with a college education. This rise in demand for more-educated workers and decline in the relative demand for workers with less education have caused an increase in the wages of college graduates relative to high school graduates. The college premium -- defined as the percentage difference between the average real wage of a four-year college graduate and a high school graduate - rose from 40 percent in 1979 to 65 percent in 1995.

In response to the dramatic increase in the college premium since the late 1970s, many more high school graduates are enrolling in post-secondary

¹¹² Peggy Golfin was in charge of this section of the report entitled: "Navy Enlisted Education".

educational institutions. College enrollment rates have risen dramatically since 1980, from 46 percent of youth ages 18--19 in 1980 to 60 percent in 1994. (Asch, Kilburn, and Klerman 1999, xii)

Incentive programs such as the Navy College Fund for recruiting high-tech personnel interested in higher education should continue. "Studies also find that educational benefits have a greater effect on high-quality enlistments than do enlistment bonuses" (Warner and Asch 1995, 357). However, current incentive programs in the Navy to encourage "serving sailors" to pursue a college education are not working. "In FY97, over seven times as many Soldiers, and over nine times as many Airmen as Sailors earned Associate degrees" (Golfin and Blake 2000, 2).¹¹³

While presently the Navy College Fund program requires sailors to take college courses while on active duty, one possible amelioration to this restrictive aspect is presented by the Center for Naval Analyses' (CNA) in their proposal of Tech Prep:

CNA has been working with the Navy for the past 2 years on developing a new incentive that overcomes these difficulties. This program, built on the federal program called Tech Prep, allows a Sailor to combine credits awarded for Navy technical training with college credits earned before going on active duty to earn an Associate degree. In other words, recruits front-load college requirements that are not satisfied by Navy technical training *before* going on active duty. This allows the recruit to reduce the time and cost of college, while guaranteeing a degree within 1 to 2 years of going on active duty. This is the only military education incentive to offer such an opportunity. (Golfin and Blake 2000, 3, emphasis in original)

In the Navy, programs like the Montgomery G. I. Bill (MGIB) are used by recruiters to entice high school graduates into an initial commitment. Unfortunately, opportunities to pursue a degree are very slim once the sailor commences active duty. So those truly desiring to pursue their educational goals choose to leave the service. The

¹¹³ Cymrot, 2001 page 40 reports similar numbers of active duty enlisted achieving an Associate degree in FY 98-99 - 0.5% Navy, 2% Army and 4% Air Force. Referenced source: DOD Voluntary Education Program Fact Sheets. Website <http://voled.doded.mil/dantes/ver/index.htm>

Navy pays to educate ex-sailors, however, sending them to civilian corporations with both education and experience.

We find that of those who stay until their mid-career, less than 1 percent obtain a B.A. degree and only 8 percent have some college by eight years of service (YOS). ...

Comparing the educational attainment in 1996 of 30 year-old personnel who are still on the military shows that about 90 percent of the veterans had attained some post-secondary education while only 49 percent of the 30-year old military personnel had. In other words the most important way to combine military service with college requires that service members leave the military. The fact that most MGIB participants obtain their education after separating implies that the military does not reap any active duty return on the most important college program that it offers. The return would come in the form of having more-educated and presumably more-productive active duty service members. (Asch, Kilburn, and Klerman 1999, xv)

This researcher recommends recruiting more people with, or interested in, an associate degree and providing selected high-tech sailors opportunities to expand their education throughout their entire career. This step would include new programs such as permitting sailors up to a two-year window away from active duty to pursue their educational goals.¹¹⁴ The Navy needs to recognize the importance of education to a professional. Today's professional sailors realize that their total "professional" careers will be over forty years in length and go far beyond the time they spend in the Navy. The Navy's attitude of providing only very specific technical training leads to the under-educating of these professional sailors. To train rather than educate because that is all the Navy requires of them in their twenty years of service is short-sighted to its responsibility to its sailors and the nation. The Navy must continue to educate careerists throughout their full active duty time. Only an educated sailor will be able to adapt to the complex requirements to be found on the new generation of reduced manning ships. In the long

¹¹⁴ The idea of getting two years off active duty to pursue an associate degree is presented in more depth in the Career Management section later in this chapter.

run, the reduced numbers in manning levels achieved by having properly educated personnel will more than adequately cover incurred education costs.

Quality of Life: Civilian management books are full of advice to managers that people work best when the workplace rewards good work with more than money. Professionals demand dignity in their surroundings, flexibility in how they perform their work, and responsiveness by the employer to personal and family needs.

Over the years, behavioral scientists as well as American managers have displayed a keen interest in providing work opportunities in which a dignity in labor produces a sense of personal accomplishment or group achievement. Work offers to some people an opportunity for self-expression; to others, it provides an opportunity to enjoy belonging to a social group with some common goal. To everyone, work offers an opportunity to gain some type of tangible and intangible rewards.

An incentive system that focuses strictly on the type or size of the financial reward has minimal chance of fully achieving its goals. To have a reasonable chance for success, every incentive plan must include nonfinancial components....

Although in theory it is possible to separate the nonfinancial and financial components, in reality it is impossible....

An organization may provide intrinsic (within the person) as well as extrinsic (outside the person) satisfaction from its financial incentive program, but this requires more than an analysis of the incentive system of the organization. It requires an in-depth analysis of the entire philosophy and policies that dominate the operation of the organization.

There is no simple relationship between the financial and nonfinancial components of an incentive program because there is nothing simple about the nature of man. What is fairly easy to recognize, however is that they are not separate entities. (Henderson 1976, 259-261).

The military has clearly received the message that the All-Volunteer Force is here to stay. Under the volunteer concept the military should be able to recruit those who desire to enlist at not only the lowest possible cost to the nation but also to the individual in what they must forgo to serve their nation. Much work has gone into the study of how to recruit the enlistees the military thinks it needs, namely, mental categories I-III who are high school graduates. Most of these studies concentrate on base pay and bonuses that

are necessary to recruit enough "quality" personnel into a closed system, so that the military can groom these recruits into required leadership positions. Researchers have concluded that a large percentage of personnel currently recruited with today's methods will separate before they even get to their first reenlistment opportunity and will do so because of factors that have nothing to do with pay. The problem is as follows:

Pecuniary factors are an important influence in the decision to terminate military service, but as in the civilian literature, there is not compelling evidence that pay and benefits have stronger effects than nonpecuniary factors....

New recruits who enter the services with unrealistic expectations about military life are among the most likely to attrite....

Probability of voluntary termination from the services is increased by (1) history of antisocial behavior, legal difficulties, or poor psychological adjustment, (2) lack of high school diploma, (3) presence of a spouse and dependent children, and (4) enlistment before age 18....

It would be very useful to have statistical analyses combining econometric modeling of compensation and its effects with equally sophisticated modeling of nonpecuniary factors affecting voluntary termination. (Stolzenberg and Winkler 1983, 61-63.)

New approaches to personnel management for the 21st century sailor must be considered. If personnel are in fact the Navy's most valuable asset, then it must be recognized that management of these 21st century sailors needs to be multi-faceted. At the 1999 Military Operations Research Society's Mini-Symposium, the message of including quality of life issues was presented in numerous briefs. For example:

Clearly, the results of individual choices across the personnel life cycle shape the force and their link needs to be considered together when isolation impact of any single attrition, retention or recruiting decision.

Because of this link, multivariate approaches to measure interactions are important. "Soft" factors such as Quality of Life (QOL) need to be included in models. (Thie and Fossett 2000, 85)

GAO examined first-term attrition in 1998 and made the following recommendation: "Use existing quality-of-life surveys or create new ones to (1) collect information on the factors contributing to first-term enlistees' separation and (2) identify

quality-of-life initiatives aimed at reducing the attrition of first-term personnel" (GAO 1998b, 9). These are the basic first steps that must be taken, and, until the Navy makes the effort to gather such data, its researchers cannot provide the exacting recommendations it needs in this critical area.

Career Management: This section includes several interrelated suggestions on how the Navy should reassess the whole idea of a Navy career, which includes allowing individuals to play a much bigger role in their career's management. Such as more latitude in assignment selection. "Sailors matched, or assigned to, their preferred billets have higher continuation rates. This is true for both initial enlistees and career sailors" (Christensen and Golding 2002, 2).

"Up-or-Out." In the military, this term means that, for members to remain on active duty, they must continually progress in rank over time. In such a pyramid-shaped system, this means that some personnel with lots of experience may be forced to leave -- not because they are no longer useful to the service but because there are few spots for promotion. Therefore, not all who are qualified can be promoted. As an alternative to this process, "up-or-stay" options should be selectively offered to personnel who are proficient at higher skill levels but who do not need or want increasing leadership positions. To accompany such a new career promotion system a revised compensation plan would be needed. As for other plans, "Compensating the Sailor of the Future" is a recent Center for Naval Analyses recommendation that suggests a skill-based pay system linking pay to educational attainment and occupational skills. A sailor could remain in one skill level for an entire career, progress to higher pay grades within the skill level, or

move to a higher skill level with a different pay structure (Golding, Arkes, and Koopman 1999, 41).

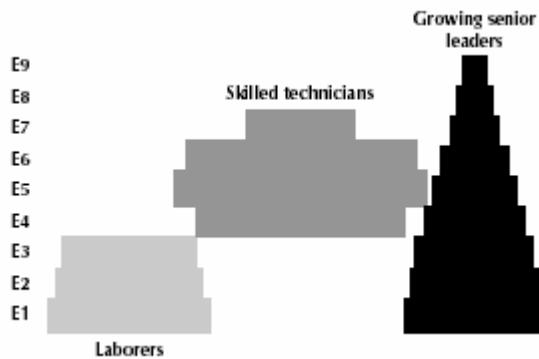
Rank is a legacy system inherited from a time where leadership was the main variable sought in the military. In effect it did not matter which of many occupations officers previously served as they were promoted on the basis of leadership skills. In the enlisted world, rate served as a factor independent of occupational area. Subsequently, the pyramid shaping of rank/rate took on a life of its own, and in a closed system it now forces up-or-out thinking. As one observer noted: "The catch is that at no point in this spiral can anyone say, 'I can serve best here,' and stop."¹¹⁵ Other nations' militaries allow people to remain at a level that they choose as do most civilian businesses and much of government service. In sum, the Navy needs to find ways around its "up-or-out" dilemma.

"The End of the Pyramid." Changing the pyramid shape of manning and billets to other formats would allow promotion of highly qualified personnel within expertise fields. Martha E. Koopman and Heidi L. W. Golding in a 1999 CNA report proposed constructing a revised pyramid shape. Such a plan would provide separate career plans, one for the basic entry level laborers, one to grow senior leaders in the enlisted community in a more traditional path and one to accommodate the necessity of grooming experts in high-tech areas. This type of personnel system would include the opportunity for lateral entry and exit in the system. This would move the Navy management system toward an open system but not totally as the leadership pyramid system would remain

¹¹⁵ From "Reforming the Ranks", by Sydney J. Freedberg Jr., in *National Journal* of August 4, 2001.

and most of the skilled technicians would continue to remain inside the system for a full twenty-year career. Table 24 and Table 25 display their career progression plan.

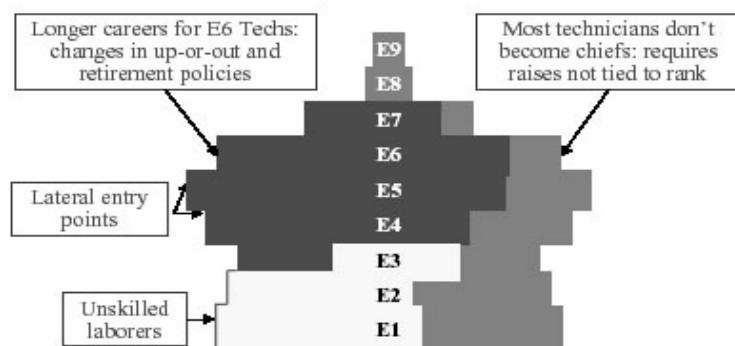
Table 24: Occupational Area Career Progression



Source: Martha E. Koopman and Heidi L. Golding. *Optimal Manning and Technological Change* (Alexandria, VA: Center for Naval Analyses, CRM 99-59, 1999) 68.

Table 25: The End of the Manpower Pyramid

The End of the Manpower Pyramid



Source: Donald J. Cymrot, ed., *The CNO Briefings: Recruiting Issues, Navy Enlisted Education Policy, Quantity and Quality of Attrition, Compensation Strategy for the Future Force* (Alexandria, VA: Center for Naval Analyses, CAB D0003425.A1/Final, 2001) 96.

The future workforce displayed in these two tables will probably include unskilled laborers who would most likely serve only one or two terms. Then through education, they would either become part of the skilled technicians or they would leave the Navy. This system would allow a person to be recruited at today's mid-grade enlisted levels. Such a system already exists in some military professions. In medical fields, for instance, doctors and dentists enter at pay grades higher than normal officer entry level. Inside the skilled technicians area multiple career choices, such as in the skill-based pay system discussed earlier, would be introduced. More options for high-tech workers to remain in their specialty while on shore duty must be provided. The Navy should investigate opening activities where its technical ratings can effectively contribute to operational unit's readiness. In the 1970's and 1980's one such type of assignment was to a Naval Mobile Technical Training Unit (MOTU). These new MOTUs would be able to have a positive impact on ships as teams of high-tech sailors as experts in their field could move between operational units for short periods of time providing repair expertise, installing equipment updates and also training operators on ships with new innovations in maintenance procedures.

"Reassessing the Closed System." Abandoning the closed personnel system and freely accepting lateral transfers in and out of the service should be considered. At present, this change is considered extremely risky by most Navy leaders. They fear that good people will try life on the outside, and, finding it better than in the Navy, will never return. At present, the severe penalties imposed on departing and then returning, make "leaving" a decision that allows little room for later reconsideration. Instead, by making changes suggested in this study and others, Navy life could become more attractive and

fully competitive with civilian work places. In this manner, senior management could feel confident that many sailors would return.

"DOD estimates of fiscal year 1998 costs indicated that by the time enlistees have been recruited and trained, generally within the first six months of service, the services have already spent about \$35,000 on each one" (GAO 1998b, 22). By continuing to use its closed system the Navy loses many key personnel with three and four years of service who leave only because of short-term personal needs. Unfortunately, they often fail to come back once the issue is resolved. Another key factor in the need for broken service is pregnancy. "Up to 10 percent of active duty female service members become pregnant each year, and there were about 75,000 military children under age 1 as of March 2001" (GAO 2002, 10). Nevertheless, the Navy does not allow new mothers to have more than six weeks convalescent leave to spend with their children. This amount of time is similar to labor intensive civilian positions but is far less than available to civilian professionals.

Another challenge is the need for other family-crisis time off. Sailors, both male and female, often need to take time off from active duty - to care for new children, or sick and/or dying family members. In addition, as suggested earlier, many desire to go full-time to college or a technical school and earn a two-year associate degree. The Coast Guard has already addressed one section of this issue, as the following GAO report states:

The agency's "care of newborn children" program permits eligible officers and enlisted personnel to be separated from active duty for a period of up to 2 years. During the separation period, members do not receive pay and benefits, but they may elect to join the Coast Guard Reserve and receive reserve pay and benefits. Upon completion of their separation period, the members are guaranteed reappointment to active duty at the same grade or rate they held when they left. Although the program was originally aimed at retaining women, other factors such as the emergence of dual-income and single-parent families, as well as other

economic and cultural changes, created the need for enhanced family care opportunities for both men and women. Of 244 service members separated under the program as of June 1999, 133 were women and 111 were men. The Coast Guard found that 47 percent of members who had separated under the program had returned to active duty when their separation period ended. (GAO 2002, 11)

Introduce its own plan would allow the Navy to grant good sailors with four to six years of service a break of up to two years away from active duty. Such sailors could use their accrued G.I. benefits to get an associate degree or a technical school diploma/certificate. Even without pay or benefits half of these sailors (based on Coast Guard experience) would return. With this opportunity the Navy would enhance the professional nature of its high-tech sailors helping them to use a benefit originally presented as an enlistment incentive. Other good career sailors, facing dilemmas of sick families members or initial parenting responsibilities, should be offered the same kind of plan so that they could choose to satisfy family responsibilities. Based on Coast Guard experience, most would demonstrate their loyalty to the Navy by returning after a year or two absence.

Conclusion

Without definite change in its recruitment and retention policies, the Navy will face an ongoing personnel shortage in certain key areas. This challenge is recognized by this report from the National Research Council:

One critical finding regarding youth attitudes is that the propensity to enlist in the military among high school males has been declining since the mid-1980's, while prior to that time, propensity had been increasing. In this key group for recruiting, the proportion indicating that they "definitely will" join a military Service has declined from 12 to 8 percent during that time period. There has also been a shift in interest reflected by a decline in those indicating they "probably won't" and an increase in those saying "definitely won't" join. The proportion least interested in military service has increased in the past two decades from about 40 to about 60 percent. The percentage of females who say they "definitely will" serve has remained at 5 percent

over the past several years; however, since 1980, the percentage who say they "definitely won't" serve has increased from 75 to approximately 82 percent. (National Research Council 2002, ES-4)

The task facing the Navy in the 21st century is to recruit and retain the best suited personnel to serve in its high-tech war fighting positions. As can be seen from the above quote by the National Research Council, future initial recruitment will not be easy and retention may be even harder. This study examined the history of manpower management practices over the last few decades. Of special help were the survey data gathered in the "1999 Survey of Active Duty Personnel" conducted by the Department of Defense. These data helped the researcher to compare responses made between high-tech personnel and sailors who do more labor intensive work. Statistical comparisons of respondents answers revealed that high-tech sailors and labor intensive sailors have differing career expectations.

The first finding concerns compensation. Although money and overall compensation are important to them, high-tech personnel do not make their retention decisions based simply on monetary factors. Currently, Navy personnel management policies are adequate for satisfying labor intensive skill personnel, judged by the fact that recruitment and retention of low-tech sailors exceeds requirements. This study reveals, however, that a different approach is required to satisfy the Navy's need for high-tech personnel. Several recommendations have been made on ways to change personnel management procedures to more fully recognize the professional nature of today's high-tech sailors. Further studies must be conducted in the area of Quality of Life to link theory to practice. Specifically, the Navy must invest in new manpower studies that will allow it to consider

the needs of high-tech sailors and to move away from its current models that only consider monetary issues.

Numerous recommendations have been made in the area of Career Management. One significant change would be to ensure that high-tech sailors shore duty assignments are meaningful and directly related to the sailor's occupational expertise. An expansion in the of Shore Intermediated Maintenance Activity (SIMA) program in both total locations and size of units would be a good first step. These activities provide technical help to sailors by sailors and help high-tech personnel on shore duty to remain working in their specialty area. This shift must include such non-traditional assignments as allowing sailors to work as government quality control personnel in civilian corporations developing technical equipment for the Navy's use. Here they could stay in touch with technical developments in their field of expertise, they might miss in a more traditional shore assignment. Up-or-stay options must be considered for retaining technical experts who are not well fitted for leadership positions. This change should include a revised skill-based pay system and non-traditional manpower pyramids. Finally the idea of the closed system and its severely limited options for lateral entry must be reexamined. The Navy must consider the advantages of having this flexible management tool when it deals with high-tech professional sailors.

Another key consideration is education. Educational opportunities must be expanded to include sending sailors who want to go to two-year institutions the opportunity. Also recent graduates of associate degree programs or post-secondary technical schools must receive renewed recruitment emphasis. Education is important to high-tech sailors as a part of their professional career path, which extends well beyond even a full twenty year

career in the Navy. Providing educational opportunities for sailors requires new ideas such as allowing exceptional sailors the opportunity to pursue a degree off active duty for up to two years.

The Navy is expected to maintain or expand its various roles in support of U.S. national interests over the next few decades. Roles such as forward presence require, deploying sophisticated vessels with expensive technology, and these ships are best operated with high-tech personnel. Current Navy personnel management systems seem ill-prepared to handle this paradigm shift because current practices rely heavily on past economic models designed to recruit minimum wage earners and retain labor intensive workers. Even if economic enticements alone permit personnel managers to recruit a sufficient number of "someone" sailors their system is inadequate. Whether the Navy recruits by monetary means, conscription, or by pleas for patriotism, the ethics of not recruiting and retaining the "best suited" sailors or ignoring the personal needs of its high-tech professional sailors must be questioned. The key issue concerns leadership. The Navy cannot modify its personnel management system properly until its leaders are convinced that this requirement is real and that *they* must fix it.

A significant disconnect now exists between the personnel system and the needs of the Navy's high-tech sailors who must manage 21st century weapon systems. This new cohort of young men and women require a fundamental change in the methodology used to recruit, educate, retain, and manage these modern professionals. The Navy must adapt its personnel management system to deal properly with the cultural change in its sailors. Otherwise, the Navy itself may fail in its goal to remain the world's premier sea power in the 21st century.

APPENDIX ONE

1999 SURVEY OF ACTIVE DUTY PERSONNEL - FORM A

The following pages of this Appendix contain a black and white and slightly reduced reproduction of the actual survey form used in the Department of Defense Survey. Full-size color copies of the form are available from Defense Manpower Data Center by requesting their report, "Overview of the 1999 Survey of Active Duty Personnel." This report is also filed as DMDC Report No. 2000-008, of February 2001. The exact survey instrument is labeled, DMDC Survey No. 99-0001.

RCS # DD-P&R (OT) 2072
Exp. 03/03/2000

1999 Survey of Active Duty Personnel

Form A



DMDC Survey No. 99-0001

DEFENSE MANPOWER DATA CENTER
ATTN: SURVEY PROCESSING CENTER
DATA RECOGNITION CORPORATION
5900 BAKER ROAD
MINNETONKA, MN 55345-5967

PLEASE DO NOT WRITE IN THE AREA BELOW



SERIAL #

PRIVACY NOTICE

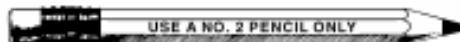
In accordance with the Privacy Act of 1974 (Public Law 93-579), this notice informs you of the purpose of the survey and how the findings will be used. Please read it carefully.

AUTHORITY: 10 U.S.C. 136, 10 U.S.C. 1782 and 10 U.S.C. 2358

PRINCIPAL PURPOSE: Information collected in this survey will be used to assess attitudes and perceptions of military life. This information will assist in the formulation of policies which may be needed to improve the military working environment and relevant personnel policies.

ROUTINE USES: Reports will be provided to the Secretaries of Defense and Transportation, and each Military Service. Findings will be used in reports and provided to Congress. Some findings may be published by the Defense Manpower Data Center (DMDC) or professional journals, or reported in manuscripts presented at conferences, symposia, and scientific meetings. In no case will the data be reported or used for identifiable individual(s).

DISCLOSURE: Providing information on this survey is voluntary. There is no penalty if you choose not to respond. However, maximum participation is encouraged so that the data will be complete and representative. Your survey instrument will be treated as confidential. Identifying information will be used only by persons engaged in, and for the purposes of, the survey. Only group statistics will be reported.



THIS IS NOT A TEST, SO TAKE YOUR TIME.

SELECT ANSWERS THAT BEST FIT YOU.

MARK ONLY ONE ANSWER FOR EACH QUESTION
UNLESS THE QUESTION SAYS TO MARK ALL THAT APPLY.

- MAKE HEAVY BLACK MARKS THAT FILL THE RESPONSE CIRCLES.
- DO NOT MAKE ANY MARKS OUTSIDE OF THE RESPONSE CIRCLES OR WRITE-IN BOXES.
- IF YOU CHANGE YOUR MIND, ERASE OLD MARKS COMPLETELY.
- DO NOT USE INK, BALL-POINT, OR FELT TIP PENS.

RIGHT MARK

WRONG MARKS

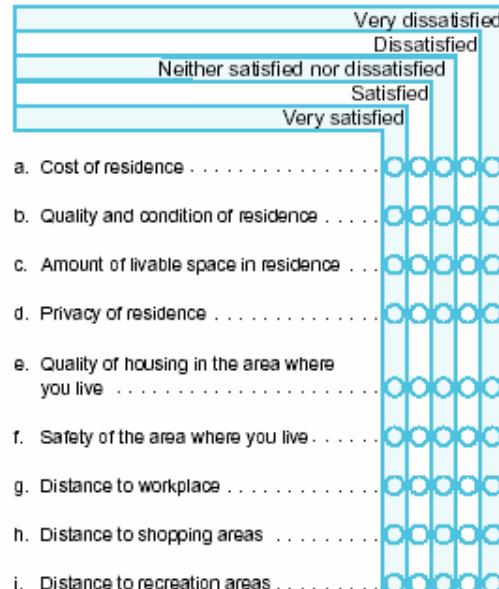
ASSIGNMENT INFORMATION

1. During the past 12 months, how many hours per week did you usually work?
 - 40 hours or less
 - 41–50 hours
 - 51–60 hours
 - 61–70 hours
 - 71–80 hours
 - 81 hours or more
2. During your last full workweek, how many hours did you work?
 - 40 hours or less
 - 41–50 hours
 - 51–60 hours
 - 61–70 hours
 - 71–80 hours
 - 81 hours or more
3. When you have had to work more hours than usual during the past 12 months, what were the primary reasons? (MARK ALL THAT APPLY.)
 - Not applicable
 - Mission critical requirements
 - Mission preparation/training/maintenance
 - Tasked with additional duties (e.g., special projects)
 - Unit was getting ready for deployment
 - Manning not sufficient for workload (i.e., not enough authorizations/billets)
 - Unit was under-manned (i.e., authorizations/billets not filled)
 - Part of unit was deployed
 - Demanding supervisor
 - Problems involving subordinates
 - High workload
 - Poor planning or lack of planning
 - Others were not carrying their workload
 - Inspections and inspection preparation
 - Equipment failure and repairs
 - None of the above
4. Are you currently assigned to ship or shore duty?
 - Ship
 - Shore
 - Does not apply, I do not have a ship/shore rotation

In this survey, "permanent duty station" is considered your permanent post, base, port, or other duty location, such as, a recruiting station.

5. Where is your permanent duty station located?
 - In one of the 50 States or the District of Columbia
 - In American Samoa, Guam, U.S. Virgin Islands or Puerto Rico
 - Overseas
6. Are you currently on a deployment that will keep you away from home for at least 30 consecutive days?
 - Yes
 - No ⇒ Go to Question 8
7. Where are you currently deployed?
 - In one of the 50 States or the District of Columbia
 - In American Samoa, Guam, U.S. Virgin Islands or Puerto Rico
 - Overseas
 - Afloat at sea
8. Where do you live at your permanent duty station?
 - Aboard ship
 - Barracks/dorm (including BEQ or BOQ)
 - Geographic bachelor's barracks
 - Military family housing, on base
 - Military family housing, off base
 - Civilian housing that I own or pay mortgage on
 - Military or civilian housing that I rent, off base
 - Other

9. How satisfied are you with the following characteristics of your current residence and community at your permanent duty station?



PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

10. Why did you choose your current residence at your permanent duty station? (MARK ALL THAT APPLY.)

- I had no choice in my residence
- Best value for the money
- Safety and security
- Close to workplace
- Close to base facilities, services or programs
- Spouse's choice
- Better schools
- Fewer rules
- Privacy
- Wanted to live in a specific area or community
- Available right away
- Military housing was unavailable
- Civilian housing was unavailable
- Better than available military housing (on base or off base)
- Better than available civilian housing
- Wanted military neighbors
- Wanted civilian neighbors
- Other

11. If your cost to live in civilian or military housing at your permanent duty station were the same, where would you prefer to live?

- Military housing, on base
- Military operated housing, off base
- Civilian housing

12. During your active duty career, how many permanent changes of station (PCSs) have you made? (INCLUDE PCS FOR A REMOTE OR UNACCOMPANIED TOUR.)

- Does not apply, I have not yet received my first assignment \Rightarrow Go to Question 14
- 1 6
- 2 7
- 3 8
- 4 9
- 5 10 or more

13. For your most recent PCS move, were any of the following a problem? (ANSWER EVEN IF THIS IS YOUR FIRST ASSIGNMENT.)

	Does not apply
	Not a problem
	Slight problem
	Somewhat of a problem
	Serious problem
d. Selling or renting out your former residence	○○○○○
e. Purchasing or renting your current residence	○○○○○
f. Amount of time to prepare for move	○○○○○
g. Shipping/storing household goods	○○○○○
h. TAD/TDY en route	○○○○○
i. Temporary lodging expenses	○○○○○
j. Costs related to security deposit(s)	○○○○○
k. Cost of moving pets	○○○○○
l. Cost of moving vehicles	○○○○○
m. Costs of setting up new residence (e.g., curtains, carpeting, painting)	○○○○○
n. Settling damage claims	○○○○○
o. Non-reimbursed transportation costs incurred during the move	○○○○○
p. Timeliness of reimbursements	○○○○○
q. Accuracy of reimbursements	○○○○○
r. Time off at destination to complete move	○○○○○
s. Change in cost of living	○○○○○
t. Loss or decrease of spouse income	○○○○○
u. Spouse employment	○○○○○
v. Transferability of entitlements (e.g., Supplemental Security Income)	○○○○○
w. Obtaining special education services	○○○○○
x. Spouse/dependents changing schools	○○○○○
y. Transferability of college credits	○○○○○
z. Availability of childcare	○○○○○

In this survey, the definition of "military duties" includes deployments, TADs/TDYs, training, military education, time at sea, and field exercises/alerts.

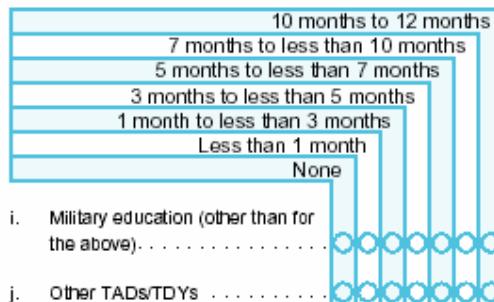
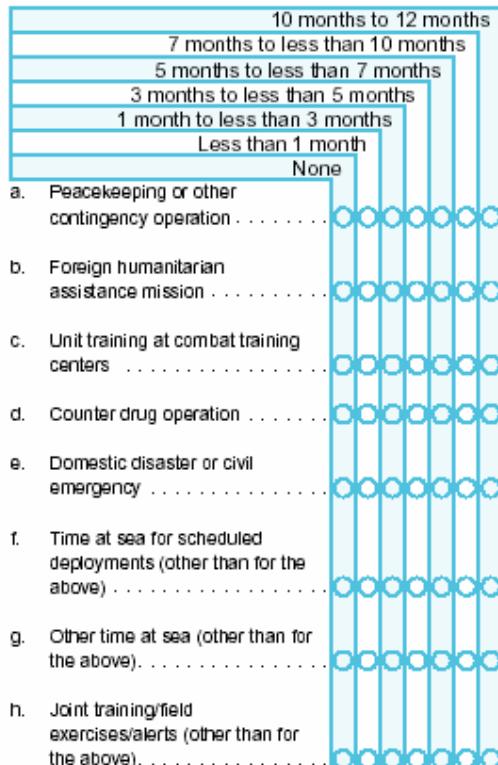
14. In the past 12 months, have you been away from your permanent duty station overnight because of your military duties?

Yes
 No \Rightarrow Go to Question 19

15. In the past 12 months, how many separate times were you away from your permanent duty station for at least one night because of your military duties?

1-2 times 9-10 times
 3-4 times 11-12 times
 5-6 times 13 times or more
 7-8 times

16. During the past 12 months, how long were you away from your permanent duty station for the following military duties? (ADD UP ALL NIGHTS AWAY FROM YOUR PERMANENT DUTY STATION; ASSIGN EACH NIGHT TO ONLY ONE TYPE OF MILITARY DUTY.)



17. In the past 12 months, what was the total length of time you were away from your permanent duty station because of your military duties? (ADD UP ALL NIGHTS AWAY FROM YOUR PERMANENT DUTY STATION.)

Less than 1 month
 1 month to less than 3 months
 3 months to less than 5 months
 5 months to less than 7 months
 7 months to less than 10 months
 10 months to 12 months

18. During the past 12 months, have any of the following been a concern while you were away? (MARK ALL THAT APPLY.)

Managing expenses and bills
 Household repairs, yard work, car maintenance
 Storage or security of personal belongings
 Pet care
 Interruption of off duty education
 Loss of part-time job
 Your ability to communicate with family
 Safety of your family in their community
 Spouse's job demands or education demands
 Childcare arrangements
 Eldercare
 Child/children's education
 Serious health or emotional problems of spouse, child, parent, sibling, or elderly family member
 Divorce or marital problems
 Birth or adoption of a child
 Your or your spouse's pregnancy
 Death of a family member
 Major financial hardship or bankruptcy within your family
 Major home repair or replacement due to casualty, theft, fire or severe weather (e.g., hurricane, flood, earthquake, tornado)
 Other (specify): 

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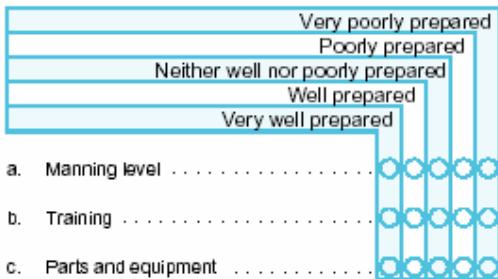


SERIAL #

19. How many days over the past 12 months have you been detailed for work outside the scope of your primary duties (e.g., "augmentee" assignments, maintenance tasks, installation support, support tasking, and wing ready teams)?

- None
- 1–10 days
- 11–20 days
- 21–30 days
- 31–40 days
- 41–50 days
- 51–60 days
- More than 60 days

20. How prepared do you believe your unit is to perform its mission with regard to . . . ?



21. Suppose you will be in the military for the next 12 months. What is the total length of time that you would expect to be away from your permanent duty station because of your military duties?

- I would not expect to be away from my permanent duty station in the next 12 months
- Less than 1 month
- 1 month to less than 3 months
- 3 months to less than 5 months
- 5 months to less than 7 months
- 7 months to less than 10 months
- 10 months to 12 months

CAREER INFORMATION

22. What were your career intentions when you first entered active duty?

- I intended to remain on active duty until I was eligible for retirement
- I intended to complete my obligation and then leave active duty
- I was not sure if I would stay on active duty or leave

23. Think back to when you first entered active duty. Which of the following best describe the primary reasons why you joined? (MARK ALL THAT APPLY.)

- A. Trouble in college or break from school
- B. Get away from family, personal situation, or home town
- C. Time to figure out what you wanted to do
- D. Test yourself physically or mentally
- E. Challenging or interesting work
- F. Always wanted to be in the military
- G. Military tradition in your family
- H. Parents' encouragement
- I. Desire to serve your country
- J. Image portrayed by military personnel
- K. Few or no civilian job opportunities
- L. Pay and allowance(s)
- M. Retirement pay and benefits
- N. Security and stability of the job
- O. Opportunity to work in a specific occupation
- P. Training in skills useful for civilian employment
- Q. Family benefits
- R. Travel and new experiences
- S. Money for college, college repayment, education benefits and opportunities
- T. Personal growth and maturity
- U. Other

24. Of all your reasons listed in Question 23, which is the most important reason why you joined?

<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F	<input type="radio"/> G
<input type="radio"/> H	<input type="radio"/> I	<input type="radio"/> J	<input type="radio"/> K	<input type="radio"/> L	<input type="radio"/> M	<input type="radio"/> N
<input type="radio"/> O	<input type="radio"/> P	<input type="radio"/> Q	<input type="radio"/> R	<input type="radio"/> S	<input type="radio"/> T	<input type="radio"/> U

25. . . and which is the next most important reason why you joined?

<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F	<input type="radio"/> G
<input type="radio"/> H	<input type="radio"/> I	<input type="radio"/> J	<input type="radio"/> K	<input type="radio"/> L	<input type="radio"/> M	<input type="radio"/> N
<input type="radio"/> O	<input type="radio"/> P	<input type="radio"/> Q	<input type="radio"/> R	<input type="radio"/> S	<input type="radio"/> T	<input type="radio"/> U

None

26. When you first entered active duty service, did you have a preference for a military occupation?

- Yes
- No \Rightarrow Go to Question 28

27. Did you receive the military occupation of your choice?

- Yes
- No, but I received a related occupation
- No, I received an occupation unrelated to my choice

28. How satisfied are you now with the military occupation you received when you first entered active duty?

Very satisfied
 Satisfied
 Neither satisfied nor dissatisfied
 Dissatisfied
 Very dissatisfied

29. In which term of service are you serving now? (DO NOT COUNT EXTENSIONS AS SEPARATE TERMS OF ENLISTMENT.)

I am on indefinite status ⇒ Go to Question 32
 I am an officer serving an obligation
 1st enlistment
 2nd or later enlistment

30. How much time remains in your current enlistment term or service obligation?

Less than 3 months
 3 months to less than 7 months
 7 months to less than 1 year
 1 year to less than 2 years
 2 years to less than 3 years
 3 years or more

31. How likely is it that you would be allowed to stay on active duty service at the end of your current term or service obligation?

Very likely
 Likely
 Neither likely nor unlikely
 Unlikely
 Very unlikely

32. Suppose that you have to decide whether to stay on active duty. Assuming you could stay, how likely is it that you would choose to do so?

Very likely
 Likely
 Neither likely nor unlikely
 Unlikely
 Very unlikely

33. If you stay on active duty, when would you expect your next promotion to a higher grade?

Less than 3 months
 3 months to less than 7 months
 7 months to less than 1 year
 1 year to less than 2 years
 2 years or more
 Does not apply, I do not expect a promotion
 Does not apply, I have no opportunities for promotion

34. Does your spouse, girlfriend or boyfriend think you should stay on or leave active duty?

Strongly favors staying
 Somewhat favors staying
 Has no opinion one way or the other
 Somewhat favors leaving
 Strongly favors leaving
 Does not apply, I don't have a spouse or girlfriend/boyfriend

35. If you could stay on active duty as long as you want, how likely is it that you would choose to serve in the military for at least 20 years?

Very likely
 Likely
 Neither likely nor unlikely
 Unlikely
 Very unlikely
 Does not apply, I have 20 or more years of service

36. When you finally leave active duty, how many total years of service do you expect to have?

		YEARS																			
0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10

For example, if you expect to leave after completing 6 years of service, enter "06" in the boxes and fill in the corresponding circles. To indicate less than 1 year, enter "00."

37. If you were to leave active duty in the next 12 months, what would be your primary activity?

Attend college or university
 Work for civilian company or organization
 Work in a civilian government job (local, state, or federal)
 Manage or work in family business
 Self-employed in your own business or profession
 A homemaker/housewife/househusband
 Go into full-time retirement
 None of the above

38. When you leave active duty, how likely is it that you will join a National Guard or Reserve unit?

Very likely
 Likely
 Neither likely nor unlikely
 Unlikely
 Very unlikely
 Does not apply, I am a member of a National Guard or Reserve unit
 Does not apply, retiring or otherwise ineligible

PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

39. How satisfied are you with each of the following?

	Does not apply	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
A. Basic pay	○	○	○	○	○	○
B. Special and incentive pay	○	○	○	○	○	○
C. Reenlistment bonus or continuation pay program	○	○	○	○	○	○
D. Housing allowance	○	○	○	○	○	○
E. SEPRATS/COMRATS, subsistence allowance	○	○	○	○	○	○
F. Military housing	○	○	○	○	○	○
G. Medical care for you	○	○	○	○	○	○
H. Dental care for you	○	○	○	○	○	○
I. Retirement pay you would get	○	○	○	○	○	○
J. Cost of living adjustments (COLA) to retirement pay	○	○	○	○	○	○
K. Other retirement benefits such as medical care and use of base services	○	○	○	○	○	○
L. Pace of your promotions	○	○	○	○	○	○
M. Chances for future advancement	○	○	○	○	○	○
N. Training and professional development	○	○	○	○	○	○
O. Type of assignments received	○	○	○	○	○	○
P. Deployments	○	○	○	○	○	○
Q. Other military duties that take you away from permanent duty station	○	○	○	○	○	○
R. Availability of equipment, parts, and resources	○	○	○	○	○	○
S. Level of manning in your unit	○	○	○	○	○	○
T. Your unit's morale	○	○	○	○	○	○
U. Your personal workload	○	○	○	○	○	○
V. Amount of personal/family time you have	○	○	○	○	○	○

Does not apply	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
----------------	-------------------	--------------	------------------------------------	-----------	----------------

W. Off duty educational opportunities

X. Quality of leadership

Y. Military values, lifestyle, and tradition

Z. Amount of enjoyment from your job

AA. Frequency of PCS moves

BB. Job security

CC. Location or station of choice, homeporting

DD. Co-location with your military spouse

EE. Medical care for your family

FF. Dental care for your family

GG. Youth activities on base

HH. Schools for your children

II. Spouse employment and career opportunities

JJ. Military family support programs

KK. Acceptable and affordable childcare

40. Even if you have no plans to stay, of all the factors listed in Question 39, which is the most important factor for staying or considering staying on active duty?

○ A	○ B	○ C	○ D	○ E	○ F	○ G
○ H	○ I	○ J	○ K	○ L	○ M	○ N
○ O	○ P	○ Q	○ R	○ S	○ T	○ U
○ V	○ W	○ X	○ Y	○ Z	○ AA	○ BB
○ CC	○ DD	○ EE	○ FF	○ GG	○ HH	○ II
○ JJ	○ KK					

41. . . and which is the next most important factor for staying or considering staying on active duty?

○ A	○ B	○ C	○ D	○ E	○ F	○ G
○ H	○ I	○ J	○ K	○ L	○ M	○ N
○ O	○ P	○ Q	○ R	○ S	○ T	○ U
○ V	○ W	○ X	○ Y	○ Z	○ AA	○ BB
○ CC	○ DD	○ EE	○ FF	○ GG	○ HH	○ II
○ JJ	○ KK	○ None				

42. Even if you have no plans to leave, of all the factors listed in Question 39, which is the most important factor for leaving or considering leaving active duty?

<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F	<input type="radio"/> G
<input type="radio"/> H	<input type="radio"/> I	<input type="radio"/> J	<input type="radio"/> K	<input type="radio"/> L	<input type="radio"/> M	<input type="radio"/> N
<input type="radio"/> O	<input type="radio"/> P	<input type="radio"/> Q	<input type="radio"/> R	<input type="radio"/> S	<input type="radio"/> T	<input type="radio"/> U
<input type="radio"/> V	<input type="radio"/> W	<input type="radio"/> X	<input type="radio"/> Y	<input type="radio"/> Z	<input type="radio"/> AA	<input type="radio"/> BB
<input type="radio"/> CC	<input type="radio"/> DD	<input type="radio"/> EE	<input type="radio"/> FF	<input type="radio"/> GG	<input type="radio"/> HH	<input type="radio"/> II
<input type="radio"/> JJ	<input type="radio"/> KK					

43. ... and which is the next most important factor for leaving or considering leaving active duty?

<input type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C	<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F	<input type="radio"/> G
<input type="radio"/> H	<input type="radio"/> I	<input type="radio"/> J	<input type="radio"/> K	<input type="radio"/> L	<input type="radio"/> M	<input type="radio"/> N
<input type="radio"/> O	<input type="radio"/> P	<input type="radio"/> Q	<input type="radio"/> R	<input type="radio"/> S	<input type="radio"/> T	<input type="radio"/> U
<input type="radio"/> V	<input type="radio"/> W	<input type="radio"/> X	<input type="radio"/> Y	<input type="radio"/> Z	<input type="radio"/> AA	<input type="radio"/> BB
<input type="radio"/> CC	<input type="radio"/> DD	<input type="radio"/> EE	<input type="radio"/> FF	<input type="radio"/> GG	<input type="radio"/> HH	<input type="radio"/> II
<input type="radio"/> JJ	<input type="radio"/> KK					
<input type="radio"/> None						

MILITARY LIFE

44. How important should the following factors be in determining total military compensation, including pay, benefits, and allowances?

Does not apply
Not important
Somewhat important
Moderately important
Important
Very important

a. Job difficulty

b. Job performance

c. Danger

d. Time spent away from home

e. Number of hours worked

f. Level of responsibility

g. Amount of education/training

h. Years of experience

i. Amount civilian employer would pay for this type of work

j. Amount needed to provide for family

k. Cost of living

45. How much do you agree or disagree with the following statements?

Strongly disagree
Disagree
Neither agree nor disagree
Agree
Strongly agree

a. During the past 12 months, the missions I was involved with were important to the national interest

b. During the past 12 months, most or all of the military duties I performed improved or maintained unit or individual readiness

c. I would find it rewarding to deploy on a peacekeeping/peacemaking operation (e.g., Bosnia)

d. I would find it rewarding to deploy on an overseas humanitarian relief effort (e.g., foreign disaster relief such as Nicaragua)

e. Very little of my experience and training can be directly transferred to a civilian job

f. It would be easy for me to get a good civilian job if I left the military now

g. I have a pretty good idea of the kinds of jobs I could get as a civilian

h. I have a pretty good idea of what pay I could get as a civilian

i. The benefits available to military personnel and their families have eroded over the past few years

j. If asked today, I would encourage others to join the military

46. In general, has your life been better or worse than you expected when you first entered the military?

Much better
 Somewhat better
 About what you expected
 Somewhat worse
 Much worse
 Don't remember

PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

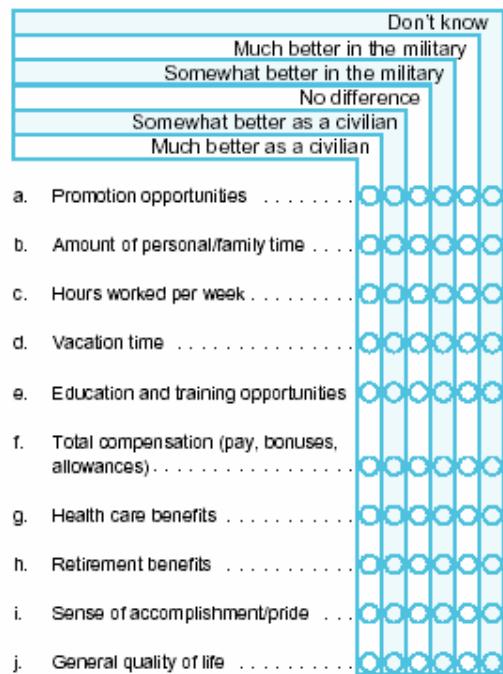
47. In general, has your work been better or worse than you expected when you first entered the military?

- Much better
- Somewhat better
- About what you expected
- Somewhat worse
- Much worse
- Don't remember

48. During the past 6 months, have you done any of the following to explore the possibility of leaving the military? (MARK ALL THAT APPLY.)

- Thought seriously about leaving the military
- Wondered what life might be like as a civilian
- Discussed leaving and/or civilian opportunities with family members or friends
- Talked about leaving with my immediate supervisor
- Gathered information on education programs or colleges
- Gathered information about civilian job options (e.g., read newspaper ads, attended a job fair)
- Attended a program that helps people prepare for civilian employment
- Prepared a resume
- Applied for a job
- Interviewed for a job
- None of the above

49. How do your opportunities in the military compare to opportunities you would have in the civilian world?



50. How much do you agree or disagree with the following statements?

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
--	-------------------	----------	----------------------------	-------	----------------

- a. Most of my friends belong to the military community
- b. The military community is there for me when I need it
- c. I have a lot in common with the civilian community
- d. Members of the military community sometimes turn to me for help or support
- e. Living on base helps active duty members and their families make ends meet
- f. I talk up my Service to my friends as a great organization to be a part of
- g. There is not much to be gained for me by sticking with a military career
- h. I am proud to be a member of my Service
- i. I find that my values and the values of my Service are very similar
- j. Being a member of my Service inspires me to do the best job I can
- k. I would turn down another job for more pay in order to remain in my Service
- l. My Service's evaluation/selection system is effective in promoting its best members
- m. If I stay in the Service, I will be promoted as high as my ability and effort warrant

51. Now, taking all things together, how satisfied are you with the military way of life?

- Very satisfied
- Satisfied
- Neither satisfied nor dissatisfied
- Dissatisfied
- Very dissatisfied

PROGRAMS AND SERVICES

52. On average during a month, how often do you use the following on base programs, facilities, or services and civilian off base programs, facilities, or services?

For <u>each</u> of these 13 items, mark one response in column A <u>and</u> one response in column B.	A. On Base Program, Facility or Service						B. Civilian Off Base Program, Facility or Service									
	Not available	0 times	1-5 times	6-10 times	11-15 times	16-20 times	21-25 times	26 times or more	Not available	0 times	1-5 times	6-10 times	11-15 times	16-20 times	21-25 times	26 times or more
1. Fitness Center/Gym	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. Library services	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Outdoor recreation areas (e.g., campgrounds, picnic areas, beach, stables)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Outdoor recreation equipment rental	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Recreation center (e.g., recreation room, music/TV, game room/amusement machines)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Golf course	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. Bowling center	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. Recreation lodging/hotel or resorts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. Clubs/dance/night clubs	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. Commissary/supermarket/grocery store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. Main exchange/department store	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Social activities for service members (e.g., trips, special events, tournaments)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. Auto, crafts and hobby shops	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

53. During the past 12 months, have you used any of the following programs and services? (MARK ONE ANSWER IN EACH ROW.)

	Yes	No
a. Adult continuing education/counseling	<input type="radio"/>	<input type="radio"/>
b. Tuition assistance programs for college/higher education	<input type="radio"/>	<input type="radio"/>
c. Technical/vocational programs	<input type="radio"/>	<input type="radio"/>
d. Basic skills education	<input type="radio"/>	<input type="radio"/>

FAMILY INFORMATION

54. What is your marital status?

- Now married
- Separated
- Divorced ⇒ Go to Question 57
- Widowed ⇒ Go to Question 57
- Never married ⇒ Go to Question 58

55. Is your spouse currently: (MARK ALL THAT APPLY.)

- Serving on active duty (not a member of the National Guard or Reserve)
- Member of the National Guard or Reserve in a full-time active duty program (AGR, TAR, AR)
- Other type of National Guard or Reserve member (e.g., drilling unit, IMA, IRR, military technician)
- Working in a Federal civilian job (full-time)
- Working in a Federal civilian job (part-time)
- Working in a civilian job on base (full-time)
- Working in a civilian job on base (part-time)
- Working in a civilian job off base (full-time)
- Working in a civilian job off base (part-time)
- Managing or working in family business
- Self-employed in his/her own business or profession
- Unemployed and looking for work
- In school
- Homemaker/housewife/househusband
- Retired
- Other (specify):

56. What is the highest degree or level of school that your spouse has completed? (MARK THE ONE ANSWER THAT DESCRIBES THE HIGHEST GRADE OR DEGREE THAT YOUR SPOUSE HAS COMPLETED.)

- 11th grade or less
- 12 years of school, no diploma
- High school graduate—high school diploma or the equivalent (e.g., GED)
- Some college credit, but less than 1 year
- 1 or more years of college, but no degree
- Associate degree (e.g., AA, AS)
- Bachelor's degree (e.g., BA, AB, BS)
- Master's, doctoral degree, or professional school degree (e.g., MA/MS/PhD/MD/JD/DVM)

57. How many times have you been divorced?

- None
- 1
- 2
- 3 or more

For questions in this section, the definition of "child or children" or "other legal dependents" includes anyone in your family, except your spouse, who has or is eligible to have a Uniformed Services identification card (military ID card) or is eligible for military health care benefits and is enrolled in the Defense Enrollment Eligibility Reporting System (DEERS).

58. Do you have a child, children or other legal dependents based on the definition above?

- Yes
- No ⇒ Go to Question 73

59. How many children or other legal dependents do you have in each age group? (MARK ONE ANSWER IN EACH ROW.)

Age	None	1	2	3	4	5 or more
a. Under 1 year old	<input type="radio"/>					
b. 1 year to under 2 years old	<input type="radio"/>					
c. 2-5 years old.	<input type="radio"/>					
d. 6-13 years old.	<input type="radio"/>					
e. 14-22 years old.	<input type="radio"/>					
f. 23-64 years old.	<input type="radio"/>					
g. 65 years old or older.	<input type="radio"/>					

60. How many children or other legal dependents do you have in each of the following age groups who live on a regular basis with you at your permanent duty station? (MARK ONE ANSWER IN EACH ROW.)

Age	None	1	2	3	4	5 or more
a. Under 1 year old	<input type="radio"/>					
b. 1 year to under 2 years old	<input type="radio"/>					
c. 2-5 years old.	<input type="radio"/>					
d. 6-13 years old.	<input type="radio"/>					
e. 14-22 years old.	<input type="radio"/>					
f. 23-64 years old.	<input type="radio"/>					
g. 65 years old or older.	<input type="radio"/>					

61. How many children or other legal dependents do you have in each of the following age groups who live on a regular basis at a different location than your permanent duty station? (MARK ONE ANSWER IN EACH ROW.)

Age	None	1	2	3	4	5 or more
a. Under 1 year old	<input type="radio"/>					
b. 1 year to under 2 years old	<input type="radio"/>					
c. 2-5 years old.	<input type="radio"/>					
d. 6-13 years old.	<input type="radio"/>					
e. 14-22 years old.	<input type="radio"/>					
f. 23-64 years old.	<input type="radio"/>					
g. 65 years old or older.	<input type="radio"/>					

PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

62. During the past 12 months, have you routinely used any of the following childcare arrangements? (MARK ALL THAT APPLY.)

Not applicable, I have not used any of the following childcare arrangements \Rightarrow Go to Question 68

Child's other parent or stepparent

Child's brother or sister (aged 15 or older)

Child's brother or sister (under the age of 15)

Child's grandparent

Other relative

Friend or neighbor

Sitter, nanny, or au pair

Preschool (on base)

Preschool (off base)

"Child Development Center" (on base)

Childcare center/day care center (off base)

"Family Childcare Home" (on base)

Childcare provider in a home setting (off base)

"School-Age Care Program" (on base)

After-school program (off base)

Federally supported Head Start program

None of the above

63. How many of your children routinely use the childcare arrangements marked in Question 62?

1

2

3

4

5 or more

64. What is the total amount that you spent last month on childcare arrangements for all of your children?

Does not apply, I spent no money on childcare arrangements last month

MONTHLY CHILDCARE EXPENSE

\$

Write your monthly expense in the boxes, then fill in the corresponding circles. For example, if you spent \$100 last month, you would enter "0100."

65. During the past 12 months, was there any change in your childcare arrangements for your child or children?

Yes

No \Rightarrow Go to Question 68

66. For what reasons did the childcare arrangements change? (MARK ALL THAT APPLY.)

Beginning, ending, or changes in a child's school enrollment

Beginning, ending, or changes in military assignment

Beginning, ending, or changes in spouse's school enrollment

Cost

Availability or hours of care provider

Reliability of care provider

Quality of care provided

Care provider's location or accessibility

Never had any regular arrangement

Child outgrew arrangement

No longer eligible for assistance

Arrangement no longer available

Other (specify):

67. During the past 12 months, did you lose any time from your military duties (work, school, or training) due to a change in childcare arrangements?

Yes

No

68. Do you have a child or children enrolled in school?

Yes

No \Rightarrow Go to Question 73

69. What type of school does your youngest school-age child attend?

College or university \Rightarrow Go to Question 73

Public school off base

Public school on base

DoD school for dependents

A religion-affiliated school

A private day school, not religion-affiliated

A private boarding school

Home school

Other (specify):

70. About how many hours per week does your child usually spend in school? (If you have more than one child, answer for the youngest school-age child.)

HOURS PER WEEK

Write the number of hours in the boxes, then fill in the corresponding circles.

71. For the type of school you marked in Question 69, please rate the following.

NA/DK = Not applicable or don't know	E = Fail
	D = Poor
	C = Satisfactory
	B = Good
	A = Excellent

- a. Overall academic program
- b. Support services provided by the school
- c. Special education programs
- d. Physical plant (building, school grounds, heating/cooling, food service, etc.)
- e. Availability of extracurricular activities
- f. Safety of school
- g. Overall quality of the school

72. Have you participated in, or have you been involved with, the following activities related to your child's or children's education? (MARK ALL THAT APPLY.)

- Attending conferences or meetings with teachers regarding the school
- Working with teachers to promote achievement
- Collaborating on educational opportunities for students, parents, and teachers
- Planning and implementing curricular and extracurricular activities
- Participating in decision making and problem solving to promote learning
- None of the above

73. Do you have a child, spouse, or other legal dependent enrolled in the Exceptional Family Member Program (EFMP) or the Coast Guard Special Needs Program?

- Yes
- No

74. Do you have caregiver responsibilities for an elderly family member (shopping, home maintenance, transportation, checking on them by phone, finances, arrangements for care, etc.)? (This includes persons who live with you or live somewhere else.)

- Yes
- No Go to Question 77

75. How many elderly family members do you have caregiver responsibilities for?

- One
- Two
- Three or more

76. During the past 12 months, did you lose any time from your military duties due to eldercare responsibilities?

- Yes
- No

77. How satisfied or dissatisfied are you with each of the following aspects of military health care for your family?

- Does not apply, I do not have any family members eligible to receive military health care Go to Question 78

Very dissatisfied	Dissatisfied
Neither satisfied nor dissatisfied	
Satisfied	Very satisfied

- a. My out-of-pocket cost for care
- b. Skill of physicians and other medical providers
- c. Availability of specialists
- d. Ability to get appointments
- e. Waiting time in the clinic
- f. Overall quality of care
- g. Administrative requirements (claims, paperwork, approvals, etc.)

78. In the last month, did you perform any non-military volunteer work?

- Yes Go to Question 80
- No

79. What were your reasons for not volunteering? (MARK ALL THAT APPLY.)

- I was not asked to perform volunteer work
- I did not have time for volunteer work
- I did not have access to childcare so I could perform volunteer work
- I am not interested in volunteer work
- I did not have transportation
- None of the above

PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

80. How is your general outlook about your life?

- Very optimistic
- Optimistic
- Neither optimistic nor pessimistic
- Pessimistic
- Very pessimistic

81. Are you accompanied by family members (spouse, child, or other legal dependents) at your permanent duty station?

- Yes \Rightarrow Go to Question 83
- No

82. Why didn't your family members accompany you to your permanent duty station? (MARK ALL THAT APPLY.)

- Does not apply, I have no family members
- Legal separation or divorce from spouse
- Temporarily unaccompanied (family members will join me later)
- Permanently unaccompanied because it was required for the authorization/billet
- Permanently unaccompanied because family members were not command sponsored (overseas tour)
- Permanently unaccompanied because household goods move was not authorized with PCS orders
- Spouse's career
- Spouse's education
- Child's/children's education
- Health or illness of family member
- Eldercare responsibilities
- Other (specify):

83. During your active duty career, how many times did your family members move to a new location because of your permanent change of station (PCS)?

<input type="radio"/> None	<input type="radio"/> 6
<input type="radio"/> 1	<input type="radio"/> 7
<input type="radio"/> 2	<input type="radio"/> 8
<input type="radio"/> 3	<input type="radio"/> 9
<input type="radio"/> 4	<input type="radio"/> 10 or more
<input type="radio"/> 5	

84. Have any of your relatives ever served on active military duty? (MARK ALL THAT APPLY.)

- Parent or guardian
- Spouse
- Brother or sister
- Son or daughter
- Grandparent
- Uncle or aunt
- Cousin
- Other close relative
- None of my relatives have served on active duty

ECONOMIC ISSUES

The questions in this section address economic issues in the lives of military members and their families. The information will be used to better understand the economic and financial concerns of military members and their families. Although people will have different views on what is or is not personal, many people will consider some of the questions very personal. Please continue with the survey even if there are some questions that you want to skip.

85. During your off-duty time, do you currently hold a second job or work at your own business?

- Yes
- No \Rightarrow Go to Question 87

86. On average, how many hours a week do you spend working at a civilian job or working at your own business during your off-duty hours?

HOURS PER WEEK	
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

For example, if you worked 8 hours, enter "08" in the boxes and fill in the corresponding circles.

87. During the past 12 months, did you (and your spouse) receive any income or financial support from the following sources? (MARK ALL THAT APPLY.)

- A second job
- Alimony
- Child support
- Supplemental Security Income (SSI)
- Unemployment or Worker's compensation
- State-funded childcare assistance
- Women, Infants, and Children (WIC)
- Food Stamp Program
- Head Start Program
- Aid to Families with Dependent Children (AFDC)
- Medicaid
- Other (specify):

88. What is your total monthly gross (before-tax) household income from all sources? (Please include your military earnings, your earnings from a second job, your spouse's earnings, and income or financial support from any other source.)

\$1–1,000
 \$1,001–2,000
 \$2,001–3,000
 \$3,001–4,000
 \$4,001–5,000
 \$5,001–6,000
 \$6,001–7,000
 \$7,001–8,000
 \$8,001–9,000
 \$9,001–10,000
 \$10,001 and above

89. Roughly, what is the total amount of savings you (and your spouse) have? (Please include funds in bank accounts, IRAs, money market accounts, Certificates of Deposit (CDs), Savings Bonds, mutual funds, stocks and/or bonds.)

\$0
 \$1–1,000
 \$1,001–2,500
 \$2,501–5,000
 \$5,001–7,500
 \$7,501–10,000
 \$10,001–12,500
 \$12,501–15,000
 \$15,001–17,500
 \$17,501–20,000
 \$20,001–50,000
 \$50,001–100,000
 \$100,001 and above

90. Do you (or your spouse) pay child support?

Yes, I pay child support
 Yes, my spouse pays child support
 Yes, both my spouse and I pay child support
 No

91. What is the total amount you (and your spouse) paid last month for rent or mortgage?

\$0
 \$1–400
 \$401–800
 \$801–1,200
 \$1,201–1,600
 \$1,601–2,000
 \$2,001 and above

92. What is the total amount you (and your spouse) paid last month for all car loans and leases on cars, trucks, or motorcycles?

\$0
 \$1–250
 \$251–500
 \$501–750
 \$751–1,000
 \$1,001–1,250
 \$1,251–1,500
 \$1,501 and above

93. What is the amount of payments that you (and your spouse) made last month to cover personal unsecured debt? (Include all credit cards, debt consolidation loans, AAFES loans, NEXCOM loans, student loans, and other personal loans; exclude home mortgage and car loans.)

\$0
 \$1–150
 \$151–300
 \$301–450
 \$451–600
 \$601–750
 \$751–900
 \$901–1,050
 \$1,051 and above

94. After the last payment was made on personal unsecured debt, what was the total amount you (and your spouse) still owed? (Include all credit cards, debt consolidation loans, AAFES loans, NEXCOM loans, student loans, and other personal loans; exclude home mortgage and car loans.)

\$0
 \$1–1,000
 \$1,001–2,500
 \$2,501–5,000
 \$5,001–7,500
 \$7,501–10,000
 \$10,001–12,500
 \$12,501–15,000
 \$15,001–17,500
 \$17,501–20,000
 \$20,001 and above

95. Which of the following best describes the financial condition of you (and your spouse)?

Very comfortable and secure
 Able to make ends meet without much difficulty
 Occasionally have some difficulty making ends meet
 Tough to make ends meet but keeping your head above water
 In over your head

PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

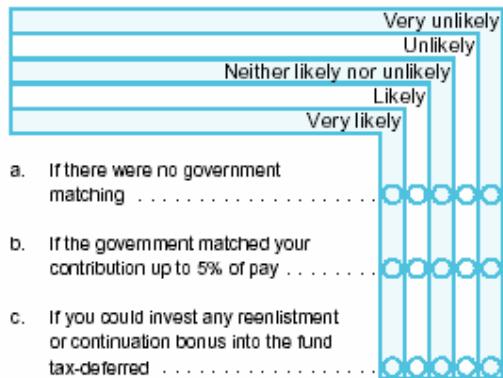
96. In the past 12 months, did any of the following happen to you (and your spouse)? (MARK ALL THAT APPLY.)

- Bounced two or more checks
- Received a letter of indebtedness (e.g., a letter from a lender to your commanding officer that payment is late)
- Had your wages garnished
- Fell behind in paying your rent or mortgage
- Fell behind in paying your credit card, AAFES, or NEXCOM account
- Was pressured to pay bills by stores, creditors, or bill collectors
- Had a bill collector contact your unit leader
- Pawned or sold valuables to make ends meet
- Borrowed money from friends or relatives to help you with a financial difficulty
- Borrowed money through an Emergency Loan Assistance Program or a Service Aid Society
- Had your utilities (telephone, cable, water, heat or electricity) shut off
- Had a car, household appliances, or furniture repossessed
- Was unable to afford needed medical care
- Went bankrupt (declared personal bankruptcy)
- None of the above

A Thrift Savings Plan (TSP) is a tax-deferred retirement savings plan like a 401(k) plan.

- Employees may deposit a portion of their pay (typically up to 5 or 10 percent) before taxes into a long-term fund to provide savings for retirement.
- Employers may match none, some, or all of their employees' contributions.
- A wide range of investment options is generally available, including funds that follow the stock and bond markets.
- TSP funds may be taken to another employer or rolled over into other qualified retirement savings plans.
- Funds may begin to be withdrawn at around age 59½—earlier withdrawals are usually penalized.

97. If this type of plan were made available to you, how likely would you be to participate in each of the following situations?



98. Which, if any, of the following is your main concern about the military retirement system?

- Does not apply, I have no concerns
- No pension benefits are earned unless you serve at least 20 years
- No ability to save toward retirement with a 401(k) or other retirement savings program
- The government does not match any money you put away for retirement
- You cannot transfer your retirement benefits to another employer
- Other

99. Currently, military personnel do not qualify for retirement benefits unless they serve for at least 20 years. If the system were changed so that you became eligible after at least 10 years of service for a deferred pension payable at age 62, how much influence would this have on your willingness to stay in the military until at least the 10-year point?

- Does not apply, I have already served 10 years
- Does not apply, I already intend to stay
- Little or no influence
- Some influence
- Moderate influence
- Strong influence

100. Congress is considering a proposal to modify the retirement pay formula for those who entered the service on or after August 1, 1986 to the same formula that applied to those who entered before that date. Assuming the retirement pay formula were changed, how much influence would this have on your willingness to stay in the military?

- This would not affect me since I entered the service before August 1, 1986
- Does not apply, I already intend to stay
- Little or no influence
- Some influence
- Moderate influence
- Strong influence

BACKGROUND INFORMATION

101. Are you:

- Male
- Female

102. Is English a second language for you?

- Yes
- No

103. Are you Spanish/Hispanic/Latino? (MARK "No" IF NOT SPANISH/HISPANIC/LATINO.)

- No, not Spanish/Hispanic/Latino
- Yes, Mexican, Mexican American, Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, other Spanish/Hispanic/Latino

104. What is your race? (MARK ONE OR MORE RACES TO INDICATE WHAT YOU CONSIDER YOURSELF TO BE.)

- White
- Black or African-American
- American Indian or Alaska Native
- Asian (e.g., Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese)
- Native Hawaiian or other Pacific Islander (e.g., Samoan, Guamanian, or Chamorro)
- Some other race (specify):

105. At the time you first came on active duty, how much education had you completed? (MARK THE ONE ANSWER THAT DESCRIBES THE HIGHEST GRADE OR DEGREE THAT YOU HAD COMPLETED.)

- 11th grade or less
- 12 years of school, no diploma
- High school graduate—high school diploma or the equivalent (e.g., GED)
- Some college credit, but less than 1 year
- 1 or more years of college, but no degree
- Associate degree (e.g., AA, AS)
- Bachelor's degree (e.g., BA, AB, BS)
- Master's, doctoral degree, or professional school degree (e.g., MA/MS/PhD/MD/JD/DVM)

106. What is the highest degree or level of school that you have completed? (MARK THE ONE ANSWER THAT DESCRIBES THE HIGHEST GRADE OR DEGREE THAT YOU HAVE COMPLETED.)

- 11th grade or less
- 12 years of school, no diploma
- High school graduate—high school diploma or the equivalent (e.g., GED)
- Some college credit, but less than 1 year
- 1 or more years of college, but no degree
- Associate degree (e.g., AA, AS)
- Bachelor's degree (e.g., BA, AB, BS)
- Master's, doctoral degree, or professional school degree (e.g., MA/MS/PhD/MD/JD/DVM)

107. Are you currently serving on active duty and/or in the Guard/Reserve?

- Yes, serving on active duty (not a member of the Guard/Reserve)
- Yes, a member of the Guard/Reserve in a full-time active duty program (AGR, TAR, AR)
- Yes, other type of Guard/Reserve member (e.g., drilling unit, IMA, IRR, military technician)
- No ⇒ Go to Question 110

108. In what Service are you?

<input type="radio"/> Army	<input type="radio"/> Air Force
<input type="radio"/> Navy	<input type="radio"/> Coast Guard
<input type="radio"/> Marine Corps	

109. What is your current paygrade?

<input type="radio"/> E-1	<input type="radio"/> W-1	<input type="radio"/> O-1
<input type="radio"/> E-2	<input type="radio"/> W-2	<input type="radio"/> O-2
<input type="radio"/> E-3	<input type="radio"/> W-3	<input type="radio"/> O-3
<input type="radio"/> E-4	<input type="radio"/> W-4	<input type="radio"/> O-4
<input type="radio"/> E-5	<input type="radio"/> W-5	<input type="radio"/> O-5
<input type="radio"/> E-6		<input type="radio"/> O-6 or above
<input type="radio"/> E-7		
<input type="radio"/> E-8		
<input type="radio"/> E-9		

110. How many years of active duty service have you completed?

0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

YEARS

For example, if you have completed 3 years of service, you would enter "03." To indicate less than 1 year, enter "00."

111. What date did you complete this survey?

DATE

MONTH	DAY	YEAR
<input type="radio"/> January	0	<input type="radio"/> 1999
<input type="radio"/> February	0	<input type="radio"/> 2000
<input type="radio"/> March	1	0
<input type="radio"/> April	1	1
<input type="radio"/> May	2	2
<input type="radio"/> June	3	3
<input type="radio"/> July	4	4
<input type="radio"/> August	5	5
<input type="radio"/> September	6	6
<input type="radio"/> October	7	7
<input type="radio"/> November	8	8
<input type="radio"/> December	9	9

PLEASE DO NOT WRITE IN THIS AREA



SERIAL #

COMMENTS

112. If you have comments or concerns that you were not able to express in answering this survey, please write them in the space provided. If your comments relate to specific questions on this survey, please make a note of the question number beside your comment.



- PLEASE RETURN YOUR COMPLETED SURVEY IN THE BUSINESS REPLY ENVELOPE.
- IF YOU ARE RETURNING THE SURVEY FROM ANOTHER COUNTRY, BE SURE TO RETURN THE BUSINESS REPLY ENVELOPE THROUGH A U.S. GOVERNMENT MAIL ROOM OR POST OFFICE.
- FOREIGN POSTAL SYSTEMS WILL NOT DELIVER BUSINESS REPLY MAIL.

THANK YOU FOR YOUR TIME AND ASSISTANCE

BARCODE

PLEASE DO NOT WRITE IN THE AREA BELOW



SERIAL #

APPENDIX TWO

ACTIVE DUTY PAY, ALLOWANCES, AND BENEFITS

The following pages of this Appendix contain a slightly modified (e.g. typeface and some spacing) reproduction of material found in Appendix 1 of the GAO Report (GAO-02-935) of September 2002, entitled "Military Personnel: Active Duty Benefits Reflect Changing Demographics, But Opportunities Exist to Improve."

The purpose of displaying this Appendix is to present a simple look into the complex system of benefits and allowances presently in use.¹¹⁶ GAO reports:

This appendix lists active duty pays, allowances, and benefits that we identified during our review. We compiled this list from Department of Defense (DOD) financial management regulations, service budget documents, military compensation background papers, DOD and service Web sites, directives, and other department documents. (GAO 2002, 21).

¹¹⁶ Navy personnel are eligible for all benefits listed in this Annex except the Navy does not have veterinarians. Although the Navy has no veterinarians, the Army often assigns one of its veterinarians at a Navy base. When this occurs active duty, retired personnel and their dependents are eligible for minor pet care (e.g. shots) at a cost below civilian providers.

GAO Appendix I

Active Duty Pay, Allowances, and Benefits

This appendix lists active duty pays, allowances, and benefits that we identified during our review. We compiled this list from Department of Defense (DOD) financial management regulations, service budget documents, military compensation background papers, DOD and service Web sites, directives, and other department documents.

Table 1: Components of the Military Compensation System

Pay/allowance/benefit	Major components	Subcomponents
Basic pay		
Housing	<ul style="list-style-type: none"> • Basic allowance for housing, domestic • Basic allowance for housing, overseas • Government housing 	<ul style="list-style-type: none"> • Partial-domestic • Substandard family housing • With dependents • Without dependents • With dependents • Without dependents
Subsistence	<ul style="list-style-type: none"> • Basic allowance for subsistence • Subsistence-in-kind • Family subsistence supplemental allowance 	<ul style="list-style-type: none"> • Augmentation for separate meals • Authorized to mess separately • Leave rations • Partial • Rations-in-kind not available • Subsistence in messes • Food service regionalization • Special rations • Operational rations • Augmentation rations • Sale of meals
Continental United States cost of living allowance		
Incentive pay, hazardous duty and aviation career pay	<ul style="list-style-type: none"> • Chemical munitions • Dangerous viruses (or bacteria) lab duty pay • Demolition pay • Flight deck duty pay • Experimental stress duty pay • Flying duty pay 	<ul style="list-style-type: none"> • Aviation career, officers • Aviator continuation pay • Career enlisted flyer pay • Crew members, enlisted • Crew nonrated • Noncrew member

GAO Appendix I
Active Duty Pay, Allowances, and Benefits

(Continued From Previous Page)

Pay/allowance/benefit	Major components	Subcomponents
	<ul style="list-style-type: none"> • High-altitude low-opening pay • Parachute jumping pay • Special warfare officer pay (extended active duty) • Submarine duty pay • Surface warfare officer continuation pay • Toxic fuels (or propellants) duty pay • Toxic pesticides duty pay 	<ul style="list-style-type: none"> • Continuous monthly submarine duty pay • Incentive pay for operational submarine duty
Special pay	<ul style="list-style-type: none"> • Biomedical science • Civil engineer corps accession bonus • Dental officers • Diving duty pay • Enlistment bonus • Foreign language proficiency pay • Hardship duty pay • High-deployment per-diem allowance • Hostile fire pay/imminent danger pay • Judge advocate continuation pay • Medical officers • Optometrists • Nuclear accession bonus • Nuclear officer incentive pay • Nurse corps officers • Pharmacy medical • Reenlistment bonus • Responsibility pay • Scientific/engineering bonus 	<ul style="list-style-type: none"> • Accession bonus • Additional special pay • Board-certified pay • Multiyear retention bonus • Variable special pay • Additional special pay • Board-certified pay for nonphysician health care providers • Board-certified pay • Diplomate pay for psychologists • Incentive special pay • Medical officer retention bonus • Multiyear special pay • Variable special pay • Monthly special pay • Incentive special pay for certified registered nurse anesthetists • Registered nurse accession bonus • Regular • Selective

GAO Appendix I
Active Duty Pay, Allowances, and Benefits

(Continued From Previous Page)

Pay/allowance/benefit	Major components	Subcomponents
	<ul style="list-style-type: none"> • Sea and foreign duty • Special duty assignment pay • Veterinarians 	<ul style="list-style-type: none"> • Duty at certain places • Overseas extension pay • Sea duty • Monthly special pay • Diplomate pay
Relocation	<ul style="list-style-type: none"> • Dependent travel allowance • Dislocation and departure allowances • Personal money allowance • Storage of personally owned vehicle • Reimbursement for pet quarantine fees • Family separation allowance • Permanent change of station travel allowances • Station allowances, overseas 	<ul style="list-style-type: none"> • Afloat • On permanent change of station, no government quarters • On permanent change of station, dependents not authorized • On temporary duty • Accession travel • In-place consecutive overseas tours and overseas tour extension incentive program • Nontemporary storage • Operational travel • Rotational travel • Separation travel • Temporary lodging facilities • Training travel • Travel of organized units • Cost-of-living, bachelor • Cost-of-living, regular • Interim housing allowance • Moving-in housing • Temporary lodging
Temporary duty travel allowances	<ul style="list-style-type: none"> • Actual expense allowance • Miscellaneous reimbursable expenses (taxi fares, tolls, etc.) • Monetary allowance in lieu of transportation • Reimbursement for cost of transportation • Subsistence allowance 	
Uniform or clothing allowances	<ul style="list-style-type: none"> • Cash clothing replacement • Extra clothing 	<ul style="list-style-type: none"> • Basic • Special • Standard • Civilian clothing allowances for officers and enlisted personnel clothing allowances • Supplementary • Temporary duty civilian

GAO Appendix I
Active Duty Pay, Allowances, and Benefits

(Continued From Previous Page)

Pay/allowance/benefit	Major components	Subcomponents
	<ul style="list-style-type: none"> • Initial clothing • Miscellaneous clothing provision 	<ul style="list-style-type: none"> • Special initial clothing • Standard initial clothing • Lost or damaged clothing
Children and youth programs	<ul style="list-style-type: none"> • Child development system • Youth programs 	<ul style="list-style-type: none"> • Child development center • Family child care • Resource and referral programs • School-age care programs
Death and burial benefits	<ul style="list-style-type: none"> • Burial benefits • Burial costs • Continued health benefits for surviving family members • Continued privileges at commissaries, exchanges, & other facilities for families • Continued government housing or housing allowance for families • Death gratuity payments • Dependency and indemnity compensation • Federal income tax exemption • Funeral honors • Montgomery GI Bill death benefit • Payment for unused leave • Survivor and dependent education 	
Dependent education	<ul style="list-style-type: none"> • DOD dependent schools • DOD domestic dependent elementary and secondary schools 	
Disability benefits	<ul style="list-style-type: none"> • Disability retired pay • Disability severance pay • Veterans Affairs disability compensation • Veterans Affairs disability pension 	
Discount shopping	<ul style="list-style-type: none"> • Commissaries • Military exchanges 	
Education assistance	<ul style="list-style-type: none"> • Adult continuing education • Army and Navy college funds • Basic skills education • Commissioning programs • Education savings plan • Montgomery GI Bill • Navy College Assistance/Student Headstart • Student loan repayment • Technical/vocational programs • Tuition assistance 	<ul style="list-style-type: none"> • Direct commissioning • Officer Candidate School/Officer Indoctrination (Training) School • Reserve Officer Training Corps • Service academies

GAO Appendix I
Active Duty Pay, Allowances, and Benefits

(Continued From Previous Page)

Pay/allowance/benefit	Major components	Subcomponents
Family support services	<ul style="list-style-type: none"> • Chaplains • Counseling • Crisis assistance • Deployment and mobilization assistance • Exceptional Family Member Program • Family advocacy programs • Family life education • Information and referral services • Parenting programs • Personal finance management • Relocation Assistance Program • Sexual Assault Victim Intervention Program • Spouse Employment Assistance Program • Transition Assistance Program 	
Health care	<ul style="list-style-type: none"> • TRICARE <p>• Continued health care benefit program for separating service members</p>	<ul style="list-style-type: none"> • Prime • Extra • Standard • Dental plan • Prescription plan • Special needs dependents
Life insurance	<ul style="list-style-type: none"> • Service Members' Group Life Insurance • Supplemental Survivor Benefit Plan • Survivor Benefit Plan • Veterans' Group Life Insurance 	
Miscellaneous	<ul style="list-style-type: none"> • Adoption expenses/reimbursement • Commuting subsidies • Legal assistance • Long-term care insurance • Space available travel • Transition assistance • Veterans Affairs guaranteed home loan program • Veterans Affairs, other 	

GAO Appendix I
Active Duty Pay, Allowances, and Benefits

(Continued From Previous Page)

Pay/allowance/benefit	Major components	Subcomponents
Paid time off	<ul style="list-style-type: none"> • Absence over leave or liberty • Administrative absence • Advance leave • Annual leave • Convalescent leave • Educational leave of absence • Emergency leave • Environmental and morale leave programs • Excess leave • Graduation leave • Leave awaiting orders as a result of disability proceedings • Leave in conjunction with permanent change of station • Leave in conjunction with temporary duty • Leave travel in connection with consecutive overseas assignments • Liberty pass • Proceed time • Public holidays • Reenlistment leave • Rest and recuperation absence for qualified enlisted service members extending duty at designated locations overseas • Rest and recuperation program • Sick-in-quarters • Special leave accrual for service members assigned to hostile fire or imminent danger areas, certain deployable ships, mobile units, or other duty • Special liberty pass 	
Privileges at military facilities	<ul style="list-style-type: none"> • Auto, crafts, and hobby shops • Consolidated package stores • Family, youth, and community centers • Laundry and dry-cleaning services • Libraries • Movie theaters • Morale, welfare, and recreation deployment support • Officer, noncommissioned officer, and enlisted clubs • Open messes • Recreation and fitness facilities and services • Transient quarters 	

GAO Appendix I
Active Duty Pay, Allowances, and Benefits

(Continued From Previous Page)

Pay/allowance/benefit	Major components	Subcomponents
Retirement/savings benefits	<ul style="list-style-type: none"> • Armed forces retirement home • Continued privileges at military installations after retirement • Retirement • Uniformed services savings deposit program • Thrift savings plan • Travel of family members to place of retirement • Travel, shipment, and storage of household goods for retirees • TRICARE for retirees and their family members • Veterans benefits for retirees 	<ul style="list-style-type: none"> • High-3 plan • Redux/career status bonus choice • Final basic pay

Source: GAO analysis.

APPENDIX THREE

STATISTICAL RESULTS

This Appendix contains the detailed tables of statistical outputs from analysis of the "1999 Survey of Active Duty Personnel" (Defense Manpower Data Center 2001) conducted by the Department of Defense. Analysis was conducted using the statistical tool "SPSS 11.0 for Windows." SPSS is an acronym originally derived from the title "Statistical Package for the Social Sciences." It is now owned by "Statistical Product and Service Solutions," a Chicago based software company and so has kept its contracted title.

This annex only provides tabular results, with two pages of results displayed for each of the ten sub-questions. Descriptions of the analysis is provided in Chapter Five.

Table 26: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49a concerning Military or Civilian: Promotion Opportunity

No Significant Difference Found Between Tech and Non Tech Sailors

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, promotion opportunities	1.00	1105	2.2751	1.11087	.03342
	2.00	1904	2.3461	1.17356	.02690

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper		
Mil/civ opp, promotion opportunities	8.421	.004	-1.631	3007	.103	-.0710	.04353	-.15634	.01434
			-1.655	2410.610	.098	-.0710	.04290	-.15512	.01312

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, promotion opportunities because there are fewer than three groups.

Descriptives

Mil/civ opp, promotion opportunities

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1105	2.2751	1.11087	.03342	2.2095	2.3407	1.00	5.00
2.00	1904	2.3461	1.17356	.02690	2.2934	2.3989	1.00	5.00
Total	3009	2.3200	1.15126	.02099	2.2789	2.3612	1.00	5.00

ANOVA

Mil/civ opp, promotion opportunities

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.525	1	3.525	2.661	.103
Within Groups	3983.277	3007	1.325		
Total	3986.802	3008			

Table 26 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, promotion opportunities	3009	100.0%	0	.0%	3009	100.0%

Tech or Non Tech Rating * Mil/civ opp, promotion opportunities Crosstabulation

		Mil/civ opp, promotion opportunities					Total
		Much better:civil	Smwht better:civil	No difference	Smwht better:mil	Much better:mil	
Tech or Non Tech Rating	1.00	Count	293	455	155	164	38
		Expected Count	290.8	438.5	159.0	164.5	52.1
		% within Tech or Non Tech Rating	26.5%	41.2%	14.0%	14.8%	3.4%
		Residual	2.2	16.5	-4.0	.5	-14.1
	2.00	Count	499	739	278	284	104
		Expected Count	501.2	755.5	274.0	283.5	89.9
		% within Tech or Non Tech Rating	26.2%	38.8%	14.6%	14.9%	5.5%
		Residual	-2.2	-16.5	4.0	.5	14.1
Total		Count	792	1194	433	448	142
		Expected Count	792.0	1194.0	433.0	448.0	142.0
		% within Tech or Non Tech Rating	26.3%	39.7%	14.4%	14.9%	4.7%
		Residual					100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.237 ^a	4	.124
Likelihood Ratio	7.528	4	.110
Linear-by-Linear Association	2.659	1	.103
N of Valid Cases	3009		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 52.15.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.049	.124
	Cramer's V	.049	.124
N of Valid Cases		3009	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Table 27: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49b concerning Amount of Personal/Family Time

No Significant Difference Found Between Tech and Non Tech Sailors

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, amt personal/family time	1.00	1327	1.6292	.87430	.02400
	2.00	2268	1.5780	.89087	.01871

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference			
							Lower	Upper		
Mil/civ opp, amt personal/family time	Equal variances assumed	.145	.703	1.674	3593	.094	.0512	.03058	-.00876	.11115
	Equal variances not assumed			1.682	2818.094	.093	.0512	.03043	-.00847	.11086

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, amt personal/family time because there are fewer than three groups.

Descriptives

Mil/civ opp, amt personal/family time

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1327	1.6292	.87430	.02400	1.5822	1.6763	1.00	5.00
2.00	2268	1.5780	.89087	.01871	1.5414	1.6147	1.00	5.00
Total	3595	1.5969	.88501	.01476	1.5680	1.6259	1.00	5.00

ANOVA

Mil/civ opp, amt personal/family time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2.194	1	2.194	2.803	.094
Within Groups	2812.772	3593	.783		
Total	2814.966	3594			

Table 27 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, amt personal/family time	3595	100.0%	0	.0%	3595	100.0%

Tech or Non Tech Rating * Mil/civ opp, amt personal/family time Crosstabulation

		Mil/civ opp, amt personal/family time					Total
		Much better:cvl	Smwht better:cvl	No difference	Smwht better:mil	Much better:mil	
Tech or Non Tech Rating	1.00	Count	756	380	133	43	15
		Expected Count	793.2	357.7	113.0	43.9	19.2
		% within Tech or Non Tech Rating	57.0%	28.6%	10.0%	3.2%	1.1%
		Residual	-37.2	22.3	20.0	-.9	-4.2
	2.00	Count	1393	589	173	76	37
		Expected Count	1355.8	611.3	193.0	75.1	32.8
		% within Tech or Non Tech Rating	61.4%	26.0%	7.6%	3.4%	1.6%
		Residual	37.2	-22.3	-20.0	.9	4.2
Total		Count	2149	969	306	119	52
		Expected Count	2149.0	969.0	306.0	119.0	52.0
		% within Tech or Non Tech Rating	59.8%	27.0%	8.5%	3.3%	1.4%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.104 ^a	4	.017
Likelihood Ratio	12.041	4	.017
Linear-by-Linear Association	2.802	1	.094
N of Valid Cases	3595		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 19.19.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.058	.017
	Cramer's V	.058	.017
N of Valid Cases		3595	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Table 28: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49c concerning Military or Civilian: Hours Worked per Week

Significant Difference Found Between Tech and Non Tech Sailors at the .02 level.

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, hours worked per week	1.00	1332	2.0781	1.04082	.02852
	2.00	2283	1.8997	1.01738	.02129

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference			
							Lower	Upper		
Mil/civ opp, hours worked per week	Equal variances assumed	1.727	.189	5.042	3613	.000	.1784	.03538	.10902	.24775
	Equal variances not assumed			5.012	2733.188	.000	.1784	.03559	.10860	.24817

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, hours worked per week because there are fewer than three groups.

Descriptives

Mil/civ opp, hours worked per week

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1332	2.0781	1.04082	.02852	2.0221	2.1340	1.00	5.00
2.00	2283	1.8997	1.01738	.02129	1.8579	1.9414	1.00	5.00
Total	3615	1.9654	1.02954	.01712	1.9318	1.9990	1.00	5.00

ANOVA

Mil/civ opp, hours worked per week

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	26.768	1	26.768	25.425	.000
Within Groups	3803.910	3613	1.053		
Total	3830.678	3614			

Table 28 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, hours worked per week	3615	100.0%	0	.0%	3615	100.0%

Tech or Non Tech Rating * Mil/civ opp, hours worked per week Crosstabulation

			Mil/civ opp, hours worked per week					Total
			Much better:civil	Some what better:civil	No difference	Some what better:military	Much better:military	
Tech or Non Tech Rating	1.00	Count	473	447	282	95	35	1332
		Expected Count	543.1	442.2	232.5	78.1	36.1	1332.0
		% within Tech or Non Tech Rating	35.5%	33.6%	21.2%	7.1%	2.6%	100.0%
		Residual	-70.1	4.8	49.5	16.9	-1.1	
	2.00	Count	1001	753	349	117	63	2283
		Expected Count	930.9	757.8	398.5	133.9	61.9	2283.0
		% within Tech or Non Tech Rating	43.8%	33.0%	15.3%	5.1%	2.8%	100.0%
		Residual	70.1	-4.8	-49.5	-16.9	1.1	
Total	Count	1474	1200	631	212	98	3615	
	Expected Count	1474.0	1200.0	631.0	212.0	98.0	3615.0	
	% within Tech or Non Tech Rating	40.8%	33.2%	17.5%	5.9%	2.7%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.938 ^a	4	.000
Likelihood Ratio	36.679	4	.000
Linear-by-Linear Association	25.254	1	.000
N of Valid Cases	3615		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 36.11.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.101	.000
	Cramer's V	.101	.000
N of Valid Cases		3615	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Table 29: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49d concerning Military or Civilian: Vacation Time

Significant Difference Found Between Tech and Non Tech Sailors at the .02 level.

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, vacation time	1.00	1312	3.7721	1.20603	.03330
	2.00	2262	3.6118	1.30951	.02753

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference			
Mil/civ opp, vacation time	Equal variances assumed	24.845	.000	3.629	3572	.000	.1603	.04416	.07368	.24684
Mil/civ opp, vacation time	Equal variances not assumed			3.709	2924.172	.000	.1603	.04321	.07554	.24497

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, vacation time because there are fewer than three groups.

Descriptives

Mil/civ opp, vacation time

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1312	3.7721	1.20603	.03330	3.7068	3.8374	1.00	5.00
2.00	2262	3.6118	1.30951	.02753	3.5579	3.6658	1.00	5.00
Total	3574	3.6707	1.27467	.02132	3.6289	3.7125	1.00	5.00

ANOVA

Mil/civ opp, vacation time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	21.325	1	21.325	13.170	.000
Within Groups	5784.061	3572	1.619		
Total	5805.387	3573			

Table 29 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, vacation time	3574	100.0%	0	.0%	3574	100.0%

Tech or Non Tech Rating * Mil/civ opp, vacation time Crosstabulation

			Mil/civ opp, vacation time					Total
			Much better:cvl	Smwht better:cvl	No difference	Smwht better:mil	Much better:mil	
Tech or Non Tech Rating	1.00	Count	95	111	234	430	442	1312
		Expected Count	128.5	115.3	236.0	412.2	420.0	1312.0
		% within Tech or Non Tech Rating	7.2%	8.5%	17.8%	32.8%	33.7%	100.0%
		Residual	-33.5	-4.3	-2.0	17.8	22.0	
	2.00	Count	255	203	409	693	702	2262
		Expected Count	221.5	198.7	407.0	710.8	724.0	2262.0
		% within Tech or Non Tech Rating	11.3%	9.0%	18.1%	30.6%	31.0%	100.0%
		Residual	33.5	4.3	2.0	-17.8	-22.0	
Total		Count	350	314	643	1123	1144	3574
		Expected Count	350.0	314.0	643.0	1123.0	1144.0	3574.0
		% within Tech or Non Tech Rating	9.8%	8.8%	18.0%	31.4%	32.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.101 ^a	4	.002
Likelihood Ratio	17.720	4	.001
Linear-by-Linear Association	13.125	1	.000
N of Valid Cases	3574		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 115.27.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal	Phi	.069
	Cramer's V	.069
N of Valid Cases	3574	.002

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Table 30: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49e concerning Military or Civilian: Education and Training Opportunities

Significant Difference Found Between Tech and Non Tech Sailors at the .02 level.

T-Test

Group Statistics

Tech or Non Tech Rating	N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, education/training opps	1.00	1265	3.2261	1.31126
	2.00	2168	3.3699	.03687
			1.30338	.02799

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
						Lower	Upper			
Mil/civ opp, education/training opps	Equal variances assumed	.164	.686	-3.112	3431	.002	-.1438	.04622	-.23446	-.05322
	Equal variances not assumed			-3.107	2631.360	.002	-.1438	.04629	-.23461	-.05307

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, education/training opps because there are fewer than three groups.

Descriptives

Mil/civ opp, education/training opps

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1265	3.2261	1.31126	.03687	3.1538	3.2984	1.00	5.00
2.00	2168	3.3699	1.30338	.02799	3.3150	3.4248	1.00	5.00
Total	3433	3.3169	1.30794	.02232	3.2732	3.3607	1.00	5.00

ANOVA

Mil/civ opp, education/training opps

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	16.528	1	16.528	9.686	.002
Within Groups	5854.658	3431	1.706		
Total	5871.187	3432			

Table 30 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, education/training opps	3433	100.0%	0	.0%	3433	100.0%

Tech or Non Tech Rating * Mil/civ opp, education/training opps Crosstabulation

			Mil/civ opp, education/training opps					Total
			Much better:civil	Some what better:civil	No difference	Some what better:military	Much better:military	
Tech or Non Tech Rating	1.00	Count	162	240	263	350	250	1265
		Expected Count	153.3	206.0	271.2	355.6	278.9	1265.0
		% within Tech or Non Tech Rating	12.8%	19.0%	20.8%	27.7%	19.8%	100.0%
		% within Mil/civ opp, education/training opps	38.9%	42.9%	35.7%	36.3%	33.0%	36.8%
		Residual	8.7	34.0	-8.2	-5.6	-28.9	
	2.00	Count	254	319	473	615	507	2168
		Expected Count	262.7	353.0	464.8	609.4	478.1	2168.0
		% within Tech or Non Tech Rating	11.7%	14.7%	21.8%	28.4%	23.4%	100.0%
		% within Mil/civ opp, education/training opps	61.1%	57.1%	64.3%	63.7%	67.0%	63.2%
		Residual	-8.7	-34.0	8.2	5.6	28.9	
	Total		416	559	736	965	757	3433
	Expected Count		416.0	559.0	736.0	965.0	757.0	3433.0
	% within Tech or Non Tech Rating		12.1%	16.3%	21.4%	28.1%	22.1%	100.0%
	% within Mil/civ opp, education/training opps		100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.967 ^a	4	.005
Likelihood Ratio	14.863	4	.005
Linear-by-Linear Association	9.662	1	.002
N of Valid Cases	3433		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 153.29.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.066	.005
	Cramer's V	.066	.005
N of Valid Cases		3433	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 31: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49f concerning Military or Civilian: Total Compensation (pay, bonuses, allowances)

Significant Difference Found Between Tech and Non Tech Sailors at the .02 level.

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, total compensation	1.00	1214	1.9308	1.13702	.03263
	2.00	2112	2.1548	1.27995	.02785

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
						Lower	Upper			
Mil/civ opp, total compensation	48.032	.000	-5.058	3324	.000	-.2240	.04429	-.31086	-.13718	
Equal variances assumed			-5.222	2777.045	.000	-.2240	.04290	-.30815	-.13990	
Equal variances not assumed										

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, total compensation because there are fewer than three groups.

Descriptives

Mil/civ opp, total compensation

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1214	1.9308	1.13702	.03263	1.8668	1.9948	1.00	5.00
2.00	2112	2.1548	1.27995	.02785	2.1002	2.2094	1.00	5.00
Total	3326	2.0731	1.23425	.02140	2.0311	2.1150	1.00	5.00

ANOVA

Mil/civ opp, total compensation

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38.688	1	38.688	25.584	.000
Within Groups	5026.559	3324	1.512		
Total	5065.246	3325			

Table 31 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, total compensation	3326	100.0%	0	.0%	3326	100.0%

Tech or Non Tech Rating * Mil/civ opp, total compensation Crosstabulation

			Mil/civ opp, total compensation					Total	
			Much better:cvl	Smwht better:cvl	No difference	Smwht better:mil	Much better:mil		
Tech or Non Tech Rating	1.00	Count	548	421	88	95	62	1214	
		Expected Count	512.5	388.4	108.0	122.3	82.9	1214.0	
		% within Tech or Non Tech Rating	45.1%	34.7%	7.2%	7.8%	5.1%	100.0%	
	2.00	Residual	35.5	32.6	-20.0	-27.3	-20.9		
		Count	856	643	208	240	165	2112	
		Expected Count	891.5	675.6	188.0	212.7	144.1	2112.0	
	Total	% within Tech or Non Tech Rating	40.5%	30.4%	9.8%	11.4%	7.8%	100.0%	
		Residual	-35.5	-32.6	20.0	27.3	20.9		
		Count	1404	1064	296	335	227	3326	
			Expected Count	1404.0	1064.0	296.0	335.0	227.0	
			% within Tech or Non Tech Rating	42.2%	32.0%	8.9%	10.1%	6.8%	
								100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	31.903 ^a	4	.000
Likelihood Ratio	32.742	4	.000
Linear-by-Linear Association	25.396	1	.000
N of Valid Cases	3326		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 82.86.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal	Phi	.098
Nominal	Cramer's V	.098
N of Valid Cases	3326	.000

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 32: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49g concerning Military or Civilian: Health Care Benefits

No Significant Difference Found Between Tech and Non Tech Sailors

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, health care benefits	1.00	1217	3.3443	1.31875	.03780
	2.00	2116	3.3696	1.33280	.02897

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper	Lower	Upper
Mil/civ opp, health care benefits	.514	.473	-.529	3331	.597	-.0253	.04777	-.11893	.06838
			-.531	2557.010	.596	-.0253	.04763	-.11867	.06812

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, health care benefits because there are fewer than three groups.

Descriptives

Mil/civ opp, health care benefits

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1217	3.3443	1.31875	.03780	3.2701	3.4185	1.00	5.00
2.00	2116	3.3696	1.33280	.02897	3.3127	3.4264	1.00	5.00
Total	3333	3.3603	1.32755	.02299	3.3153	3.4054	1.00	5.00

ANOVA

Mil/civ opp, health care benefits

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.494	1	.494	.280	.597
Within Groups	5871.743	3331	1.763		
Total	5872.236	3332			

Table 32 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, health care benefits	3333	100.0%	0	.0%	3333	100.0%

Tech or Non Tech Rating * Mil/civ opp, health care benefits Crosstabulation

			Mil/civ opp, health care benefits					Total
			Much better:civl	Smwht better:civl	No difference	Smwht better:mil	Much better:mil	
Tech or Non Tech Rating	1.00	Count	151	188	248	351	279	1217
		Expected Count	150.1	188.8	243.5	341.8	292.8	1217.0
		% within Tech or Non Tech Rating	12.4%	15.4%	20.4%	28.8%	22.9%	100.0%
		Residual	.9	-.8	4.5	9.2	-13.8	
	2.00	Count	260	329	419	585	523	2116
		Expected Count	260.9	328.2	423.5	594.2	509.2	2116.0
		% within Tech or Non Tech Rating	12.3%	15.5%	19.8%	27.6%	24.7%	100.0%
		Residual	-.9	.8	-4.5	-9.2	13.8	
Total		Count	411	517	667	936	802	3333
		Expected Count	411.0	517.0	667.0	936.0	802.0	3333.0
		% within Tech or Non Tech Rating	12.3%	15.5%	20.0%	28.1%	24.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.565 ^a	4	.815
Likelihood Ratio	1.571	4	.814
Linear-by-Linear Association	.280	1	.597
N of Valid Cases	3333		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 150.07.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Phi	.022	.815
Nominal Cramer's V	.022	.815
N of Valid Cases	3333	

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 33: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49h concerning Military or Civilian: Retirement Benefits

Significant Difference Found Between Tech and Non Tech Sailors at the .02 level.

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, retirement benefits	1.00	1078	2.7208	1.37323	.04182
	2.00	1882	2.9841	1.42536	.03286

Independent Samples Test

	Levene's Test for equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mil/civ opp, retirement benefits	Equal variance assumed	1.068	.301	-4.900	2958	.000	-.2633	.05373	-.36863	-.15793
	Equal variance not assumed			-4.950	312.226	.000	-.2633	.05319	-.36758	-.15898

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, retirement benefits because there are fewer than three groups.

Descriptives

Mil/civ opp, retirement benefits

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1078	2.7208	1.37323	.04182	2.6387	2.8028	1.00	5.00
2.00	1882	2.9841	1.42536	.03286	2.9196	3.0485	1.00	5.00
Total	2960	2.8882	1.41206	.02595	2.8373	2.9391	1.00	5.00

ANOVA

Mil/civ opp, retirement benefits

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	47.510	1	47.510	24.013	.000
Within Groups	5852.476	2958	1.979		
Total	5899.986	2959			

Table 33 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, retirement benefits	2960	100.0%	0	.0%	2960	100.0%

Tech or Non Tech Rating * Mil/civ opp, retirement benefits Crosstabulation

			Mil/civ opp, retirement benefits					Total
			Much better:civil	Smwht better:civil	No difference	Smwht better:mil	Much better:mil	
Tech or Non Tech Rating	1.00	Count	256	294	169	213	146	1078
		Expected Count	236.4	249.5	173.4	236.0	182.8	1078.0
		% within Tech or Non Tech Rating	23.7%	27.3%	15.7%	19.8%	13.5%	100.0%
		Residual	19.6	44.5	-4.4	-23.0	-36.8	
	2.00	Count	393	391	307	435	356	1882
		Expected Count	412.6	435.5	302.6	412.0	319.2	1882.0
		% within Tech or Non Tech Rating	20.9%	20.8%	16.3%	23.1%	18.9%	100.0%
		Residual	-19.6	-44.5	4.4	23.0	36.8	
Total		Count	649	685	476	648	502	2960
		Expected Count	649.0	685.0	476.0	648.0	502.0	2960.0
		% within Tech or Non Tech Rating	21.9%	23.1%	16.1%	21.9%	17.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	30.429 ^a	4	.000
Likelihood Ratio	30.585	4	.000
Linear-by-Linear Association	23.827	1	.000
N of Valid Cases	2960		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 173.35.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.101	.000
Nominal	Cramer's V	.101	.000
N of Valid Cases		2960	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Table 34: Statistical Results of Means Comparisons: T-test, Oneway ANOVA, and Crosstabs for Question 49i concerning Military or Civilian: Sense of Accomplishment/pride

No Significant Difference Found Between Tech and Non Tech Sailors

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, sense accomplishment/pride	1.00	1260	3.1183	1.26898	.03575
	2.00	2179	3.1193	1.31058	.02808

Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mil/civ opp, sense accomplishment/pride	Equal variance assumed	2.061	.151	-.023	3437	.981	-.0011	.04585	-.09096	.08883
	Equal variance not assumed			-.023	2697.758	.981	-.0011	.04546	-.09020	.08807

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, sense accomplishment/pride because there are fewer than three groups.

Descriptives

Mil/civ opp, sense accomplishment/pride

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1260	3.1183	1.26898	.03575	3.0481	3.1884	1.00	5.00
2.00	2179	3.1193	1.31058	.02808	3.0643	3.1744	1.00	5.00
Total	3439	3.1189	1.29531	.02209	3.0756	3.1622	1.00	5.00

ANOVA

Mil/civ opp, sense accomplishment/pride

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.001	1	.001	.001	.981
Within Groups	5768.357	3437	1.678		
Total	5768.358	3438			

Table 34 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, sense accomplishment/pride	3439	100.0%	0	.0%	3439	100.0%

Tech or Non Tech Rating * Mil/civ opp, sense accomplishment/pride Crosstabulation

			Mil/civ opp, sense accomplishment/pride					Total	
			Much better:civil	Some what better:civil	No difference	Some what better:military	Much better:military		
Tech or Non Tech Rating	1.00	Count	175	196	421	241	227	1260	
		Expected Count	190.2	181.4	415.8	233.8	238.9	1260.0	
		% within Tech or Non Tech Rating	13.9%	15.6%	33.4%	19.1%	18.0%	100.0%	
		Residual	-15.2	14.6	5.2	7.2	-11.9		
	2.00	Count	344	299	714	397	425	2179	
		Expected Count	328.8	313.6	719.2	404.2	413.1	2179.0	
		% within Tech or Non Tech Rating	15.8%	13.7%	32.8%	18.2%	19.5%	100.0%	
		Residual	15.2	-14.6	-5.2	-7.2	11.9		
Total			519	495	1135	638	652	3439	
			519.0	495.0	1135.0	638.0	652.0	3439.0	
			15.1%	14.4%	33.0%	18.6%	19.0%	100.0%	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.159 ^a	4	.271
Likelihood Ratio	5.168	4	.271
Linear-by-Linear Association	.001	1	.981
N of Valid Cases	3439		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 181.36.

Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.039	.271
	Cramer's V	.039	.271
N of Valid Cases		3439	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

Table 35: Statistical Results of Means Comparisons: T-test, Oneway ANOVA and Crosstabs for Question 49j concerning Military or Civilian: General Quality of Life

Significant Difference Found Between Tech and Non Tech Sailors at the .02 level.

T-Test

Group Statistics

Tech or Non Tech Rating		N	Mean	Std. Deviation	Std. Error Mean
Mil/civ opp, general quality of life	1.00	1266	1.8981	1.02531	.02882
	2.00	2189	1.9895	1.11717	.02388

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means							95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper		
Mil/civ opp, gene quality of life	Equal variance assumed	9.932	.002	-2.387	3453	.017	-.0914	.03829	-.16646	-.01632	
	Equal variance not assumed			-2.442	827.752	.015	-.0914	.03742	-.16477	-.01801	

Oneway

Warnings

Post hoc tests are not performed for Mil/civ opp, general quality of life because there are fewer than three groups.

Descriptives

Mil/civ opp, general quality of life

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
1.00	1266	1.8981	1.02531	.02882	1.8416	1.9546	1.00	5.00
2.00	2189	1.9895	1.11717	.02388	1.9427	2.0363	1.00	5.00
Total	3455	1.9560	1.08516	.01846	1.9198	1.9922	1.00	5.00

ANOVA

Mil/civ opp, general quality of life

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.699	1	6.699	5.697	.017
Within Groups	4060.614	3453	1.176		
Total	4067.313	3454			

Table 35 (Continued)

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Tech or Non Tech Rating * Mil/civ opp, general quality of life	3455	100.0%	0	.0%	3455	100.0%

Tech or Non Tech Rating * Mil/civ opp, general quality of life Crosstabulation

			Mil/civ opp, general quality of life					Total
			Much better:civil	Smwht better:civil	No difference	Smwht better:mil	Much better:mil	
Tech or Non Tech Rating	1.00	Count	537	478	136	73	42	1266
		Expected Count	537.9	433.5	155.7	90.1	48.7	1266.0
		% within Tech or Non Tech Rating	42.4%	37.8%	10.7%	5.8%	3.3%	100.0%
		Residual	-.9	44.5	-19.7	-17.1	-6.7	
	2.00	Count	931	705	289	173	91	2189
		Expected Count	930.1	749.5	269.3	155.9	84.3	2189.0
		% within Tech or Non Tech Rating	42.5%	32.2%	13.2%	7.9%	4.2%	100.0%
		Residual	.9	-44.5	19.7	17.1	6.7	
Total		Count	1468	1183	425	246	133	3455
		Expected Count	1468.0	1183.0	425.0	246.0	133.0	3455.0
		% within Tech or Non Tech Rating	42.5%	34.2%	12.3%	7.1%	3.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.778 ^a	4	.001
Likelihood Ratio	17.957	4	.001
Linear-by-Linear Association	5.689	1	.017
N of Valid Cases	3455		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 48.73.

Symmetric Measures

	Value	Approx. Sig.
Nominal by Nominal	Phi	.072
	Cramer's V	.072
N of Valid Cases	3455	

- a. Not assuming the null hypothesis.
- b. Using the asymptotic standard error assuming the null hypothesis.

SELECTED BIBLIOGRAPHY

Books and Dissertations

Adler, Mortimer J. *Six Great Ideas*. New York: Macmillan Publishing, 1981; Collier Books, 1984.

_____. *Ten Philosophical Mistakes*. New York: Macmillan Publishing Co., 1985; Collier Books, 1987.

Akin, William E. *Technocracy and the American Dream: The Technocrat Movement, 1900-1941*. Berkeley, CA: University of California Press, 1977.

Ard, Aaron James. "Post-Cold War Manpower and Readiness Declines: The Cultural Misalignment of Civil and Military Values." Ph.D. diss., Cornell University, 2000.

Augustine, Norman R. *Augustine's Laws: A Top Executive Looks at the Complexities & Conundrums of Today's Business Management - And Offers Solutions*. Washington, D.C.: American Institute of Aeronautics and Astronautics, Inc., 1983; Rev. and expanded ed. New York: Viking Penguin Inc., 1986.

Aukofer, Frank, and William P. Lawrence. *America's Team; The Odd Couple - A Report on the Relationship Between the Media and the Military*. Nashville, TN: The Freedom Forum First Amendment Center, 1995.

Bachman, Jerald G., John D. Blair, and David R. Segal. *The All-Volunteer Force: A Study of Ideology in the Military*. Ann Arbor, MI: University of Michigan Press, 1977.

Badaracco, Joseph L. Jr., and Richard R. Ellsworth. *Leadership and the Quest for Integrity*. Boston: Harvard Business School Press, 1989.

Barbour, Ian G. *Ethics In An Age of Technology: The Gifford Lectures, 1989-1991, Volume Two*. San Francisco: HarperSanFrancisco, 1993.

Barlett, Donald L., and James B. Steele. *America: What Went Wrong*. Kansas City, KS: Andrews and McMeel Publishers, 1992.

Barnes, Rudolph C. Jr. *Military Legitimacy: Might and Right in the New Millennium*. Portland, OR: Frank Cass Publishing Co., 1996.

Barrett, William. *Death of the Soul: From Descartes to the Computer*. New York: Doubleday Anchor Press, 1986.

Bartholomew, David J., ed. *Manpower Planning*. New York: Penguin Books, 1976.

_____. "Stochastic Models and Their Application: A Review." In *Manpower Planning Models*, ed. D. J. Clough, C. C. Lewis, and A. L. Oliver, 71-80. London: The English Universities Press Ltd., 1974.

Barzun, Jacques. *Begin Here: The Forgotten Conditions of Teaching and Learning*. Chicago: The University of Chicago Press, 1991.

Barzun, Jacques, and Henry F. Graff. *The Modern Researcher*, 5th ed. Fort Worth, TX: Harcourt Brace Jovanovich College Publishers, 1957; Rev. 1985.

Bateman, C. W. "Formal and On-the-Job Training in Military Occupations." In *Manpower Planning: Operation Research and Personnel Research*, ed. NATO Science Committee, 183-198. New York: American Elsevier Publishing Company, Inc., 1965.

Bellah, Robert N., Richard Madsen, William M. Sullivan, Ann Swidler and Steven M. Tipton. *Habits of the Heart: Individualism and Commitment in American Life*. Berkeley, CA: University of California Press, 1985; New York: Harper & Row, Perennial Library, 1986.

_____. *The Good Society*. New York: Alfred A. Knopf, Inc., 1991; Vintage Books, 1992.

Berger, John. *Ways of Seeing*. New York: Penguin Books, 1977.

Berger, Peter L. *The Sacred Canopy: Elements of a Sociological Theory of Religion*. New York: Doubleday, 1967; Anchor Books, 1990.

Berger, Peter L., and Thomas Luckmann. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Garden City, NY: Doubleday, 1966; New York: Anchor Books, 1967.

Berger, Peter, Brigitte Berger, and Hansfried Kellner. *The Homeless Mind: Modernization and Consciousness*. New York: Random House, 1973; Vintage Books, 1974.

Bergmann, Frithjof. *On Being Free*. Notre Dame, IN: University of Notre Dame Press, 1977; Reprint, 1987.

Bergson, Henri. *The Two Sources of Morality and Religion*. New York: Henry Holt and Company, 1935; Notre Dame, IN: University of Notre Dame Press, 1977.

Binkin, Martin. *Military Technology and Defense Manpower*. Washington, D.C.: The Brookings Institution Press, 1986.

Binkin, Martin, and Shirley J. Bach. *Women and the Military*. Washington, D.C.: The Brookings Institution Press, 1977.

Binkin, Martin, and Irene Kyriakopoulos. *Youth or Experience? Manning the Modern Military*. Washington, D.C.: The Brookings Institution Press, 1979.

Binkin, Martin, Herschel Kanter, and Rolf H. Clark. *Shaping the Defense Civilian Work Force: Economics, Politics, and National Security*. Washington, D.C.: The Brookings Institution Press, 1978.

Blair, Margaret M., and Thomas A. Kochan, ed. *The New Relationship: Human Capital in the American Corporation*. Washington, D.C.: The Brookings Institution Press, 2000.

Block, Peter. *Choosing Service Over Self-Interest*. San Francisco: Berrett-Koehler Publishers, 1993.

Bloom, Allan. *The Closing of the American Mind*. New York: Simon & Schuster, 1987; Touchstone, 1988.

Bloman, Lee G., and Terrence E. Deal. *Reframing Organizations: Artistry, Choice and Leadership*, 2nd ed. San Francisco: Jossey-Bass Publishers, 1997.

Boorstin, Daniel J. *The Creators: A History of Heroes of the Imagination*. New York: Random House, 1992; Vintage Books, 1993.

Bottenberg, R. A. "The Use of Occupational Data in the Operation of a Manpower Allocation System." In *Manpower Planning Models*, ed. D. J. Clough, C.C. Lewis, A. L. Oliver, 67-78. London: The English Universities Press Ltd., 1974.

Bourke, Joanna. *An Intimate History of Killing: Face-to-Face Killing in Twentieth-Century Warfare*. New York: BasicBooks, 1999.

Bowman, William, Roger Little, and G. Thomas Sicilia, ed. *The All-Volunteer Force After A Decade: Retrospect and Prospect*. Washington, D.C.: Pergamon-Brassey's, 1985.

Brantley, Mary Ellen, and Chris Coleman. *Winning the Technology Talent War: A Manager's Guide To Recruiting and Retaining Tech Workers in a Dot-Com World*. New York: McGraw-Hill, 2001.

Brasher, Bart. *Implosion: Downsizing the U.S. Military 1987-2015*. Westport, CT: Greenwood Press, 2000.

Buckley, Gail. *American Patriots: The Story of Blacks in the Military From the Revolution to Desert Storm*. New York: Random House, 2001.

Carter, Ashton B. "Keeping the Edge: Managing Defense for the Future." In *Keeping the Edge: Managing Defense for the Future*, ed. Ashton B. Carter and John P. White, 1-26. Cambridge, MA: Puritan Press, 2000.

Carter, Aston B., and John P. White, ed. *Keeping the Edge: Managing Defense for the Future*. Cambridge, MA: Puritan Press, 2000.

Capra, Fritjof. *The Turning Point: Science, Society, and the Rising Culture*. New York: Simon & Schuster, 1982; Bantam Books, 1988.

Chu, David S. C., John P. White, Nurith Berstein, and John Brown. "Ensuring Quality People in Defense." In *Keeping the Edge: Managing Defense for the Future*, ed. Ashton B. Carter and John P. White, 203-234. Cambridge, MA: Puritan Press, 2000.

Church, Allan, and Janine Waclawski. *Designing and Using Organizational Surveys*. San Francisco: Jossey-Bass, 2001.

Clausewitz, Carl Von. *On War*. Edited and translated by Michael Howard and Peter Paret. Princeton, NJ: Princeton University Press, 1976; Reprint 1984.

Coffey, Kenneth J. *Manpower for Military Mobilization*. Washington, D.C.: American Enterprise Institute for Public Policy Research, 1978.

Collins, John M. *Grand Strategy:Principles and Practices*. Annapolis, MD: Naval Institute Press, 1974.

Colson, Michael Alan. "A Qualitative Case Study of Montgomery GI Bill Education Benefits and the Paradox of Underachievement in the United States Navy." Ph.D. diss., Walden University, 2000.

Combs, W.V. "Major Manpower Planning Problems." In *Manpower Planning: Operation Research and Personnel Research*, ed. NATO W.N. Jessop, 210-217. New York: American Elsevier Publishing Company, Inc., 1965.

Cressy, Peter Hollon. "The Use of Analysis in the Development of Specific Policy and Legislation at the National Level: An Analysis to Effect Policy and Legislation Regarding the Obligated Service, Retention, and Compensation of Naval Aviators (United States Navy)." Ph.D. diss., University of San Francisco, 1989.

Dansby, Mickey R., James B. Stewart and Schuyler C. Webb, ed. *Managing Diversity in the Military: Research Perspectives From the Defense Equal Opportunity Management Institute*. New Brunswick, NJ: Transaction Publishers, 2001.

Davies, Toni Serpe. "Managerial and Organizational Determinants of Organizational Change." Ph.D. diss., The Claremont Graduate University, 1998.

Dent, Harry S. Jr. *Job Shock: Four New Principles Transforming Our Work and Business*. New York: St. Martin's Press, 1995.

Dorn, Edwin, ed. *Who Defends America? Race, Sex and Class in the Armed Forces*. Washington, D.C.: Joint Center for Political Studies Press, 1989.

Downes, Larry, and Chunka Mui. *Unleashing the Killer App: Digital Strategies for Market Dominance*. Boston, MA: Harvard Business School Press, 1998.

Drengson, Alan R. "Four Philosophies of Technology." In *Technology as a Human Affair*, ed. Larry A. Hickman, 25-39. New York: McGraw-Hill Publishing Company, 1990.

Drucker, Peter F. *Managing the Non-Profit Organization Principles and Practices*. New York: Harper Collins, 1990.

_____. *Managing for the Future: The 1990's and Beyond*. New York: Penguin Books, 1992; Truman Talley Books/Plume, 1993.

Durkheim, Emile. *The Division of Labor in Society*. Translated by W.D. Halls. Originally published in French in 1893 as "Emile Durkheim on the Division of Labor in Society." New York: Macmillan Publishers, 1933; The Free Press, 1984;

Eagleton, Terry. *Literary Theory: An Introduction*. Minneapolis, MN: University of Minnesota Press, 1983; Reprint, 1993.

Eitelberg, M. J., and S. L. Mehay, "Looking Ahead: The Shape of Things to Come." In *Marching Towards the 21st Century*, ed. M. J. Eitelberg and S. L. Mehay, 1-47. Westport, CT: Greenwood Press, 1994.

Eldridge, John. *Sociology and Industrial Life*. London: Michael Joseph, 1971.

Ellul, Jacques. *The Technological Society*. Translated by John Wilkinson. Originally published in French in 1954. New York: Vintage Books, 1964.

_____. *The Technological Bluff*. Translated by Geoffrey W. Bromiley. Grand Rapids, MI: William B. Eerdmans Publishing Co., 1990.

_____. "The Autonomy of Technology." In *Technology As A Human Affair*, ed. Larry Hickman, 343-356. New York: McGraw Hill, 1990.

Enloe, Cynthia. *Does Khaki Become You? The Militarization of Women's Lives*. Boston, MA: South End Press, 1983.

Falk, Stanley L. *National Security Management: Human Resources for National Strength*. Washington, D.C.: Industrial College of the Armed Forces, 1966.

_____. *The Environment of National Security*. Washington, D.C.: Industrial College of the Armed Forces, 1968.

_____. *National Security Management: Defense Military Manpower*. Washington, D.C.: Industrial College of the Armed Forces, 1969.

Field, Andy. *Discovering Statistics Using SPSS for Windows: Advanced Techniques for the Beginner*. London: Sage Publications, 2000: Reprint 2001.

Fischer, John H. "The Role of Education in National Goals." In *Education: An Instrument of National Goals*, ed. Paul R. Hanna, 192-210. New York: McGraw-Hill, 1962.

Fleisher, Belton M., and Thomas J. Kniesner. *Labor Economics: Theory, Evidence, and Policy*, 2nd ed. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1980.

Foucault, Michael. *The Birth of the Clinic: An Archeology of Medical Perception*. Translated by A.M. Sheridan Smith. New York: Pantheon Books, 1973; Vintage Books, 1994.

Fox, Matthew. *The Reinvention of Work: A New Vision of Livelihood for Our Time*. New York: HarperCollins Publishers, 1994; San Francisco: HarperSanFrancisco, 1995.

Fredland, Eric J., Curtis L. Gilroy, Roger D. Little, and W.S. Sellman, ed. *Professionals on the Front Line: Two Decades of the All-Volunteer Force*. Washington, D.C.: Brassey's, 1996.

Freedman, David H. *Corps Business: The 30 Management Principles of the U.S. Marines*. New York: HarperBusiness, 2000.

Fromm, Erich. *The Anatomy of Human Destructiveness*. New York: Henry Holt & Co., 1992.

Fuller, J.F.C. *The Conduct of War, 1789-1961: A Study of the Impact of the French, Industrial, and Russian Revolutions on War and Its Conduct*. New Brunswick, NJ: Rutgers University Press, 1961.

Fullinwider, Robert K., ed. *Conscripts and Volunteers: Military Requirements, Social Justice, and the All-Volunteer Force*. Totowa, NJ: Rowman & Allanheld Publishers, 1983.

Galbraith, John Kenneth. *The Affluent Society*. Boston: Houghton Mifflin Company 1958; New York: Mentor Book, The New American Library, Inc., 1958.

_____. *The New Industrial State*, 4th ed. New York: Houghton Mifflin Company, 1967; Mentor Book, 1986.

Geertz, Clifford. *The Interpretation of Cultures*. New York: HarperCollins, 1973.

George, Darren, and Paul Mallory. *SPSS for Windows Step by Step: A Simple Guide and Reference 10.0 Update*, 3rd ed. Boston: Allyn and Bacon, 2001

Gillespie, Michael. *Hegel, Heidegger and the Ground of History*. Chicago: University of Chicago Press, 1984.

Gilroy, Crutis L., David K. Horne, and Alton Smith, ed. *Military Compensation and Personnel Retention: Models and Evidence*. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, 1991.

Greenberg, Jerald, and Robert A. Baron. *Behavior in Organizations: Understanding and Managing the Human Side of Work*, 7th ed. Upper Saddle River, NJ: Prentice Hall, 2000.

Greene, William H. *Econometric Analysis*, 2nd ed. New York: Macmillan, 1990.

Grinold, Richard C., and Kneale T. Marshall. *Manpower Planning Models*. New York: North Holland Publishing Co., 1977.

Gutmann, Stephanie. *The Kinder, Gentler Military: Can America's Gender-Neutral Fighting Force Still Win Wars?* New York: Charles Scribner's Sons, 2000.

Haass, Richard N. *The Bureaucratic Entrepreneur: How to Be Executive in Any Unruly Organization*. Washington D.C.: The Brookings Institution Press, 1999.

Halachmi, Arie, and Geert Bouckaert, ed. *The Enduring Challenges in Public Management: Surviving and Excelling in a Changing World*. San Francisco: Jossey-Bass Publishers, 1995.

Handy, Charles. *The Age of Unreason*. London: Business Books, Ltd, 1989; Boston: Harvard Business School Press, 1989.

Hanna, Paul R., ed. *Education: An Instrument of National Goals*. New York: McGraw-Hill, 1962.

Hanson, Deborah Ann. "An Assessment of Corporate Culture and Resistance to Technological Change in Education and Management: A Delphi Study." Ph.D. diss., Walden University, 1994.

Harman, Willis. *Global Mind Change: The New Age Revolution in the Way We Think*. Indianapolis, IN: Knowledge System 1988; New York: Warner Books, 1990.

Hawley, Jack. *Reawakening the Spirit in Work: The Power of Dharmic Management*. San Francisco: Berret-Koehler Publishers, 1993.

Henderson, Richard I. *Compensation Management: Rewarding Performance In the Modern Organization*. Reston, VA: Reston Publishing Company, Inc., 1976.

Herzberg, Fredrick. *Work and the Nature of Man*. Cleveland, OH: World Publishing Company, 1966.

_____. *The Managerial Choice: To Be Efficient and To Be Human*. Homewood, IL: Dow Jones-Irwin, 1976.

Herzenberg, Stephen A., John A. Alic, and Howard Wial. *New Rules for a New Economy: Employment and Opportunity in Postindustrial America*. Ithaca, NY: A Twentieth Century Fund Book, Cornell University Press, 1998.

Hofstadter, Richard. *Social Darwinism in American Thought*, 2nd ed. Boston: Beacon Press, 1959.

Huntington, Samuel P. *The Soldier and the State: The Theory and Politics of Civil-Military Relations*. Cambridge, MA: The Belknap Press of Harvard University Press, 1957.

Humphrey, Watts S. *Managing for Innovation: Leading Technical People*. Englewood Cliffs, NJ: Prentice-Hall, 1987.

Janowitz, Morris. *The Professional Soldier: A Social and Political Portrait*. Glencoe, IL: Free Press, 1960.

Jessop, W. N., ed. *Manpower Planning: Operational Research and Personnel Research*. New York: American Elsevier Publishing Company, Inc., 1966.

Johnson, C. D., and R. C. Sorenson. "Model Sampling Experimentation for Manpower Planning." In *Manpower Planning Models*, ed. D. J. Clough, C. C. Lewis, and A. L. Oliver, 37-52. London: The English Universities Press, Ltd., 1974.

Johnson, Janet Buttolph, and Richar A. Joslyn. *Political Science Research Methods*, 2nd ed. Washington, DC: CQ Press, A Division of Congressional Quarterly Inc., 1991.

Kant, Immanuel. *Prolegomena To Any Future Metaphysics*. Translated by L. W. Beck. Originally published in 1783. New York: Macmillan Publishing Company, 1950.

Keeley, John B., ed. *The All-Volunteer Force and American Society*. Charlottesville, VA: University of Virginia Press, 1978.

Keeney, Ralph L. *Manpower Planning and Personnel Management Models Based on Utility Theory*. San Francisco: Woodward-Clyde Consultants, 1980.

Kerlinger, Fred N. *Behavioral Research: A Conceptual Approach*. New York: Holt, Rinehart and Winston, 1979.

Kidd, Charles Vincent. *Manpower Policies for the Use of Science and Technology in Development*. New York: Pergamon Press, 1980.

Klein, Gary, *Sources of Power: How People Make Decisions*. Cambridge, MA: The MIT Press, 1998.

Kozol, Jonathan. *Savage Inequalities: Children in America's Schools*. New York: Crown Publishers, Inc., 1991.

Kuhn, Thomas S. *The Structure of Scientific Revolutions*, 2nd ed. Chicago, University of Chicago Press, 1962; Enlarged, 1970. Volume 2 number 2 of the International Encyclopedia of Unified Science, series editor Otto Neurath.

Kung, Hans. *Global Responsibility: In Search of a New World Ethic*. New York: The Crossroad Publishing Company, 1991.

Laird, Melvin R. "People, Not Hardware: The Highest Defense Priority." In *Defense Manpower Planning: Issues for the 1980's*, ed. William J. Taylor Jr., Eric T. Olson, and Richard A. Schrader, 61-79. New York: Pergamon Press, 1981.

Leavitt, Harold J. *Corporate Pathfinders: Building Vision and Values into Organizations*. Homewood, IL: Dow Jones-Irwin, 1986; New York: Penguin Books, 1987.

Leedy, Paul D. *Practical Research: Planning and Design*, 4th ed. New York: Macmillan Publishing Company, 1974; This edition 1989.

Leondes, Cornelius T., ed. *Expert Systems: The Technology of Knowledge Management for the 21st Century*. San Diego, CA: Academic Press, 2002.

Levitin, Sar A., and Karen Cleary Alderman. *Warriors At Work*. Beverly Hills, CA: Sage Publications, Inc., 1977.

Lippitz, Michael J., Sean O'Keefe, John P. White and John Brown. "Advancing the Revolution in Business Affairs." In *Keeping the Edge: Managing Defense for the Future*, ed. Ashton B. Carter and John P. White, 165-202. Cambridge, MA: Puritan Press, 2000.

Lockman, Robert F. *Trends and Issues in U.S. Navy Manpower*. Alexandria, VA: Center for Naval Analyses, 1987.

Lynn, Laurence E. Jr. *Managing the Public's Business: The Job of the Government Executive*. New York: Basic Books, 1981.

Mabey, Christopher, Graeme Salaman and John Storey. *Human Resource Management: A Strategic Introduction*. Oxford, U.K.: Blackwell Business, 1998.

MacIntyre, Alasdair. *After Virtue: A Study in Moral Theory*, 2nd ed. Notre Dame, IN: University of Notre Dame Press, 1984.

Maguire, Daniel C., and A. Nicholas Farnoli. *On Moral Grounds: The Art/Science of Ethics*. New York: The Crossroad Publishing, 1991.

Meister, Jeanne C. *Corporate Universities: Lessons in Building a World-Class Work Force*. New York: McGraw-Hill, Inc., 1994; Rev. and updated ed. 1998.

McCormack, C., and D. Jones. "What's It All About?" In *Building a Web-Based Education System*, ed. Theresa Hudson, 1-28. New York: Wiley Computer Publishing, 1998.

McGregor, Douglas. *The Human Side of Enterprise*. New York: McGraw Hill Book Company, Inc., 1960

_____. "The Scanlon Plan Through a Psychologist's Eyes." In *The Scanlon Plan . . . A Frontier in Labor-Management Cooperation*, ed. Frederick G. Lesieur, 84-97. Cambridge, MA: The M.I.T. Press, 1970.

Milgrom, Paul, and John Roberts. *Economics, Organization and Management*. Englewood Cliffs, NJ: Prentice Hall, 1992.

Miller, Herman P. "Income and Education: Does Education Pay Off?" In *Economics of Higher Education*, ed. Selma J. Mushkin, 129-46. Washington, D.C.: U.S. Department of Health, Education, and Welfare, 1962.

Montor, Karel, Thomas M. McNicholas, Jr., Anthony J. Ciotti, Jr., Thomas H. Hutchinson III, and Jackie Eckhart Wehmuller, ed. *Naval Leadership: Voices of Experience*. Annapolis, MD: U. S. Naval Institute Press, 1987.

Morgan, Garth. *Imaginization: The Art of Creative Management*. Newbury Park, CA: Sage Publications Inc., 1993.

Morrall, Abraham, Jr. "The Effect of Downsizing: Survivors Perceived Inequity, Impact and Perception (Job Security, Productivity, Retention, Recruiting)." Ph.D. diss., Nova Southeastern University, 1997.

Moskos, Charles C. Jr. "The Enlisted Ranks in the All-Volunteer Army." In *The All-Volunteer Force and American Society*, ed. John B. Keeley, 39-80. Charlottesville, VA: University Press of Virginia, 1978.

_____. *Making the All-Volunteer Force Work: A National Service Approach*. Washington, D.C.: Wilson Center, International Security Studies Program, 1981.

_____. "Armed Forces in a Warless Society." In *War*, ed. Lawrence Freedman, 134-139. New York: Oxford University Press, 1994.

Moskos, Charles C., and John H. Faris. "Beyond the Marketplace: National Service and the AVF." In *Toward a Consensus on Military Service: Report of the Atlantic Council's Working Group on Military Service*, ed. Andrew J. Goodpaster and Lloyd H. Elliott, 131-151. New York: Pergamon Press, 1982.

Moskos, Charles C., and Frank R. Wood, ed. *The Military: More Than Just A Job?* Washington, D.C.: Pergamon-Brassey's International Defense Publishers, Inc., 1988.

Moskos, Charles C., and John Sibley Butler. *All That We Can Be: Black Leadership and Racial Integration the Army Way*. New York: BasicBooks, 1996.

Mumford, Lewis. *Technics and Civilization*. Orlando, FL: Harcourt Brace & Co., 1934; First Harvest, 1963.

_____. *The Myth of the Machine: The Pentagon of Power*. New York: Harcourt Brace Jovanovich, Inc., 1970.

_____. *Transformations of Man*. New York: Harper & Row, 1956; Gloucester, MA: Peter Smith, 1978.

Murray, Robert J. "Technology and Manpower: Navy Perspective." In *The All-Volunteer Force After A Decade: Retrospect and Prospect*, ed. William Bowman, Roger Little, and G. Thomas Sicilia, 136-152. Washington, D.C.: Pergamon-Brassey's, 1985.

National Research Council. *Technology for the United States Navy and Marine Corps 2000-2035: Becoming a 21st-Century Force*. Vol. 4, *Human Resources*, by the Naval Studies Board. Washington, D.C.: National Academy Press, 1997.

Nelson, G.R. "The Supply and Quality of First-term Enlistees Under the All-Volunteer Force." In *The All-Volunteer Force After a Decade: Retrospect and Prospect*, ed. William Bowman, Roger Little, and G. Thomas Sicilia, 10-14. Washington, D.C.: Pergamon-Brassey's, 1986.

Niebuhr, Reinhold. *Moral Man and Immoral Society: A Study in Ethics and Politics*. New York: Charles Scribner's Sons, 1960.

Noel, John V. *Division Officer's Guide*, 8th ed. Annapolis, MD: Naval Institute Press, 1982. Reprint, 1988.

Oliver, Dave Jr. *Lead On: A Practical Approach to Leadership*. Novato, CA: Presidio Press, 1992.

Osborne, David, and Ted Gaebler. *Reinventing Government: How the Entrepreneurial Spirit Is Transforming the Public Sector*. Reading, MA: Addison-Wesley, 1992.

Pacey, Arnold. *The Culture of Technology*. Cambridge, MA: The MIT Press, 1983; Reprint, 1989.

Parsons, Talcott. *The Social System*. Glencoe, IL: Free Press, 1951.

Pascale, Richard. *Managing on the Edge: How the Smartest Companies Use Conflict to Stay Ahead*. New York: Simon & Schuster Inc., 1990; Touchstone, 1991.

Pearson, Carol S. *The Hero Within: Six Archetypes We Live By*. San Francisco: HarperSanFrancisco, 1989.

Peters, Tom. *Liberation Management: Necessary Disorganization for the Nanosecond Nineties*. New York: Alfred A. Knopf, Inc., 1992.

Peters, Thomas J., and Robert H. Waterman Jr. *In Search of Excellence: Lessons From America's Best-Run Companies*. New York: Harper & Row, 1982.

Phillips, Donald T. *Lincoln on Leadership: Executive Strategies for Tough Times*. New York: Warner Books, 1992.

Postman, Neil. *Technopoly: The Surrender of Culture to Technology*. New York: Alfred A. Knopf, Inc., 1992; Vintage Books, 1993.

Quade, E.S. *Analysis for Public Decisions*. New York: American Elsevier, 1975.

Ranft, Bryan and Geoffrey Till. *The Sea in Soviet Strategy* 2nd ed. Annapolis, MD: U.S. Naval Institute Press, 1989.

Ray, Michael, and Alan Rinzler, ed. *The New Paradigm in Business: Emerging Strategies for Leadership and Organization Change*. New York: A Jeremy P. Tarcher/Putnam Book, 1993.

Ricks, Thomas E. *A Soldier's Duty: A Novel*. New York: Random House, 2001.

Ritzer, George. *The McDonaldization of Society: An Investigation into the Changing Character of Contemporary Social Life*. Newbury Park, CA: Pine Forge Press, 1993.

Roszak, Theodore. *The Cult of Information: A Neo-Luddite Treatise on High Tech, Artificial Intelligence, and the True Art of Thinking*. New York: Pantheon Books, 1986; Berkeley, CA: University of California Press, 1994.

Russell, Peter, and Roger Evans. *The Creative Manager: Finding Inner Vision and Wisdom in Uncertain Times*. San Francisco: Jossey-Bass, Inc., 1992.

Schiller, Herbert I. *Culture Inc.: The Corporate Takeover of Public Expression*. New York: Oxford University Press, 1989.

Schwartz, Peter. *The Art of the Long View: Planning for the Future in an Uncertain World*. New York: Currency Doubleday, 1991; Currency Paperback, 1996.

Segal, David R., John D. Blair, Joseph J. Lengermann, and Richard C. Thompson. "Institutional and Occupational Values in the U.S. Military." In *Changing U.S. Military Manpower Realities*, ed. Franklin D. Margiotta, James Brown, and Michael J. Collins, 107-128. Boulder, CO: Westview Press, 1983.

Senge, Peter. "The Art & Practice of the Learning Organization." In *The New Paradigm in Business: Emerging Strategies for Leadership and Organization Change*, ed. Michael Ray and Alan Rinzler, 126-137. New York: A Jeremy P. Tarcher/Putnam Book, 1993.

Shapero, Albert. *Managing Professional People: Understanding Creative Performance*. New York: Collier Macmillan Free Press, 1985.

Shwinger, Pinhas. *Wage Incentive Systems*. New York: Halsted Press, 1975.

Silverman, Joe. "Personnel Resource Planning in an Operational Environment." In *Manpower Planning Models*, ed. D. J. Clough, C.C. Lewis, and A. L. Oliver, 263-273. London: The English Universities Press Ltd., 1974.

Smith, Adam. *An Inquiry into the Nature and Causes of the Wealth of Nations*. London: G. Routledge & Son, 1898.

Smith, Perry M. *Taking Charge: A Practical Guide for Leaders*. Washington, D.C.: National Defense University Press, 1986.

Snow, C.P. *The Two Cultures and A Second Look*. Cambridge, U.K.: University of Cambridge, 1959; Westford, MA: Murray Printing, 1983.

Spector, Ronald H. *At War At Sea: Sailors and Naval Combat In the Twentieth Century*. New York: Viking Penguin, 2001.

Stein, Richard J. *Learning to Manage Technical Professionals: Crossing the Swamp*. Reading, MA: Addison-Wesley, 1993.

Strunk, William Jr., and E.B. White. *The Elements of Style*, 3rd ed. New York: Macmillan, 1959.

Sowell, Thomas. *Inside American Education: The Decline, The Deception, The Dogmas*. New York: Macmillan, 1993.

Taylor, William J, Eric T. Olson, and Richard A Schrader. *Defense Manpower Planning: Issues for the 1980's*. New York: Pergamon Press, 1981.

Tenner, Edward. *Why Things Bite Back: Technology and the Revenge of Unintended Consequences*. New York: Random House, 1996; Vintage Books, 1997.

Tichy, Noel M., and Mary Anne Devanna. *The Transformational Leader*. New York: John Wiley & Sons, 1986. Reprint, 1990.

Toynbee, Arnold J. *A Study of History Abridgment of Volumes I-VI*. ed. D.C. Somervell. Oxford, U.K.: Oxford University Press, 1946; New York; Oxford University Press, 1987a.

_____. *A Study of History Abridgment of Volumes VII-X*. ed. D.C. Somervell. Oxford, U.K.: Oxford University Press, 1957; New York; Oxford University Press, 1987b.

Trybula, David Christopher. "Three Essays on the Economics of Military Manpower." Ph.D. diss., The University of Texas at Austin, 1999.

Vaill, Peter B. *Managing as a Performing Art: New Ideas for a World of Chaotic Change*. San Francisco: Jossey-Bass Publishers, 1989.

Van Aller, Christopher D. *The Culture of Defense*. Lanham, MD: Lexington Books, 2001.

Van Creveld, Martin. *Technology and War: From 2000 B.C. to the Present*. New York: Simon & Schuster, Inc., 1989; The Free Press, 1991.

Vivarelli, Marco. *The Economics of Technology and Employment: Theory and Empirical Evidence*. Brookfield, VT: Edward Elgar Publishing Co., 1995.

Walker, James W. *Human Resource Planning*. McGraw Hill Series in Management. New York: McGraw-Hill, Inc., 1980.

Warner, John T., and Beth J. Asch. "The Economics of Military Manpower." In *Handbook of Defense Economics Volume I*, ed. Keith Hartley and Todd Sandler, 348-398. Handbooks in Economics., series ed. Kenneth J. Arrow and Michael D. Intriligator. New York: Elsevier, 1995.

Winner, Langdon. *Autonomous Technology: Technics-Out-of-Control as a Theme in Political Thought*. Cambridge, MA: MIT Press, 1977; Reprint, 1992.

Wirls, Daniel. *Buildup: The Politics of Defense in the Reagan Era*. Ithaca, NY: Cornell University Press, 1992.

Wood, Frank R. "At the Cutting Edge of Institutional and Occupational Trends." In *The Military More Than Just A Job?*, ed. Charles C. Moskos and Frank R. Wood, 27-38. Washington, D.C.: Pergamon-Brassey's, 1988.

Wool, Harold. *The Military Specialist: Skilled Manpower for the Armed Forces*. Baltimore, MD: The Johns Hopkins Press, 1968.

Zumwalt, Elmo R., Jr. *On Watch: A Memoir*. New York: Quadrangle/ The New York Times Book Co., Inc., 1976.

Technical Studies, Government Reports and Student Theses

Adelman, Clifford. *A Parallel Postsecondary Universe: The Certification System In Information Technology*. Washington, D.C.: U.S. Department of Education, October 2000.

Allen, Patrick, Gart Bennet, Manuel Carrillo, Bruce Goeller, and Warren Walker. *Quality in Policy Modeling*. Santa Monica, CA: RAND, P-7640, 1990.

Andrilla, Joseph John, and Benard James McGee. *A Study of the Monetary Value of the Master's Degree in Management Issued by the Naval Postgraduate School*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, AD 721568, 1970.

Arguden, R. Yilmaz. *Personnel Management in the Military: Effects of Retirement Policies on the Retention of Personnel*. RAND, R-3342-AF, 1986.

Asch, Beth J. *Designing Military Pay: Contribution and Implications of the Economics Literature*. Santa Monica, CA: RAND, MR-161-FMP, 1993.

Asch, Beth J., and James Dertouzos. *Educational Benefits Versus Enlistment Bonuses: A Comparison of Recruiting Options*. Santa Monica, CA: RAND, MR-302-OSD, 1994.

Asch, Beth J., and John T. Warner. *A Theory of Military Compensation and Personnel Policy*. Santa Monica, CA: RAND, MR-439-OSD, 1994.

_____. *Should We Bring Back the Draft?* Santa Monica, CA: RAND, RP-828, 2000.

Asch, Beth J., M. Rebecca Kilburn, and Jacob A. Klerman. *Attracting College-Bound Youth Into the Military: Toward the Development of New Recruiting Policy Options*. Santa Monica, CA: RAND, MR-984-OSD, 1999.

Asch, Beth J., C. Christine Fair, and M. Rebecca Kilburn. *An Assessment of Recent Proposals to Improve the Montgomery GI Bill*. Santa Monica, CA: RAND, DB-301-OSD/FRP, 2000.

Asch, Beth J., James R. Hosek, and John T. Warner. *An Analysis of Pay for Enlisted Personnel*. Santa Monica, CA: RAND, DB-344-OSD, 2001.

Blanco, Thomas. "Requirements Workshop Report." In *Conference Proceedings: Naval Manpower Research in the 1980's*, ed. Stanley A. Horowitz, 39-41. Alexandria, VA: Center for Naval Analyses, CNA Report 58, 1982.

Borus, Michael E., and Choongsoo Kim. *Policy Findings Related to Military Service from the Youth Cohort of the National Longitudinal Surveys of Labor Market Experience*. Arlington, VA: Defense Manpower Data Center, ADA185414, 1985.

Brown, Charles. *Military Enlistments: What Can We Learn from Geographic Variation?* Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, ADA165663, 1984.

Buddin, Richard, Daniel Levy, Janet Hanley, and Donald Waldman. *Promotion Tempo and Enlisted Retention*. Santa Monica, CA: RAND, R-4135-FMP, 1992.

Buddin, Richard, Carole Roan Gresenz, Susan D. Hosek, Marc N. Elliott, and Jennifer Hawes-Dawson. *An Evaluation of Housing Options for Military Families*. Santa Monica, CA: RAND, MR-1020, 1999.

Carter, Grace M., Deborah L. Skoller, Stanley E. Perrin, and Clyde S. Sakai. *An Enlisted Force Management System Model to Predict the Effects of Bonus Decisions*. Santa Monica, CA: RAND, N-2747-AF, 1988.

Chief of Naval Operations (CNO). *A Report by Admiral James L. Holloway III, U.S. Navy, Chief of Naval Operations, Concerning the Fiscal Year 1979 Military Posture and Budget of the United States Navy*. Washington, D.C.: Government Printing Office, March 1978.

_____. *Manual of Navy Total Force Manpower Policies and Procedures*. Washington, D.C.; Department of the Navy, Office of the Chief of Naval Operations. (OPNAV INSTRUCTION 1000.16J of January 6, 1998).

_____. “Revolution in Training: Executive Review of Navy Training.” Washington, D.C.: Report to the CNO dated August 8, 2001. Photocopied.

Chow, Winston K., and J. Michael Polich. *Models of the First-Term Reenlistment Decision*. Santa Monica, CA: RAND, R-2468-MRAL, 1980.

Christensen, Eric W., Heidi L. W. Golding, and Lynda G. Houck. *Hard-to-Fill Billets, Individual Assignment Preferences, and Continuation*. Alexandria, VA: Center for Naval Analyses, CRM D0006179.A1/SR1, 2002.

Chu, David S. C. “Setting Defense Manpower Requirements for the 1980's.” In *Conference Proceedings: Naval Manpower Research in the 1980's*, ed. Stanley A. Horowitz, 32-38. Alexandria, VA: Center for Naval Analyses, Report 58, 1982.

Chu, David S.C., Eva Norrblom, Kent Brown, and Alfred MacInnes. *Physical Standards in an All-Volunteer Force*. Santa Monica, CA: RAND, R-1347-ARPA/DDPAE, 1974.

Cirie, John A., James J. Miller, and H. Wallace Sinaiko. *Department of Defense and Navy Personnel Supply Models: Report of a Workshop*. Arlington, VA: Office of Naval Research, ONR-TR-9, 1981.

Clay-Mendez, Deborah. *Documentation for the Recruiting Cost Estimates Utilized in the Navy Comprehensive Compensation and Supply Study*. Alexandria, VA: Center for Naval Analyses, Professional Paper 390, 1982.

Coe, James B. *Projected Manpower Requirements of the Next Generation U.S. Navy Destroyer*. Monterey, CA: Naval Postgraduate School, Student Thesis, ADA294536, 1995.

Congressional Budget Office. *Manpower for a 600-Ship Navy: Costs and Policy Alternatives*. Washington, D.C.: CBO Press, 1983.

_____. *Setting Personnel Strength Levels: Experience and Productivity in the Military*. Washington, D.C.: CBO Press, 1987.

_____. “Budgeting For Defense: Maintaining Today's Forces.” September 2000. <http://www.cbo.gov/Search.htm> Accessed November 30, 2002.

_____. “The Warrant Officer Ranks: Adding Flexibility to Military Personnel Management.” February 2002. <http://www.cbo.gov/Search.htm> Accessed December 30, 2002.

Conzen, Eric L. *An Analysis of the Impact of Fully Funded Graduate Education on the Retention of Naval Officers*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA374259, 1999.

Cooke, Timothy W. *Individual Incentives in Navy Recruiting*. Alexandria, VA: Center for Naval Analyses, CRM 86-269, 1986.

_____. *Evaluation of the Target Enlistment Bonus (TEB) for Nuclear Field Recruits*. Alexandria, VA: Center for Naval Analyses, ADA191786, 1987.

Cooper, Richard V. L. *Military Manpower and the All-Volunteer Force*. Santa Monica, CA: RAND, R-1450-ARPA, 1977.

Cotterman, Robert F. *Forecasting Enlistment Supply: A Time Series of Cross Sections Models*. Santa Monica, CA: RAND, R-3252-FMP, 1986.

Cotton, James L., Ronald L. Johnson, and Evelyn B. Scott. *U.S. Naval Ship Cost Growth*. Alexandria, VA: Center for Naval Analyses, CRC 424, 1980.

Cymrot, Donald J. *Determining the Optimal Level of Graduate Education for Naval Officers*. Alexandria, VA: Center for Naval Analyses, CRM 86-11, 1986.

Cymrot, Donald J., ed. *The CNO Briefings: Recruiting Issues, Navy Enlisted Education Policy, Quantity and Quality of Attrition, Compensation Strategy for the Future Force*. Alexandria, VA: Center for Naval Analyses, CAB D0003425.A1/Final, 2001.

Defense Advisory Committee on Professional and Technical Compensation. Report to the Secretary of Defense, *A Modern Concept of Manpower Management and Compensation For Personnel of the Uniformed Services. Volume I - Military Personnel*. Washington, D.C.: U.S. Government Printing Office, May 1957.

Defense Manpower Data Center. *Overview of the 1999 Survey of Active Duty Personnel*. Arlington, VA: DMDC Report No. 2000-008, February 2001.

Dertouzos, J. N. *The Effects of Military Advertising: Evidence from the Advertising Mix Test*. Santa Monica, CA: RAND, N-2907-FMP, March 1989.

Dessy, Blane K. "College for All? Is There Too Much Emphasis on Getting a 4-Year College Degree?" Washington, D.C.: U.S. Department of Education, 1999. <http://www.ed.gov/pubs/CollegeForAll/index.html> Accessed December 30, 2002.

Doering, Zahava D. *RAND - Department of Defense Survey Research Program, Fiscal Years 1978-1979*. Santa Monica, CA: RAND, N-1165-MRAL, 1979.

Doering, Zahava D., and William Hutzler. *Description of Officers and Enlisted Personnel in the U.S. Armed Forces: A Reference for Military Manpower Analysis*. Santa Monica, CA: RAND, R-2851-MRAL, 1980.

Doering, Zahava D., and David W. Grissmer. *Active and Reserve Force Attrition and Retention: A Selected Review of Research and Methods*. Santa Monica, CA: RAND, P-7007, 1985.

Elig, Timothy W., R. M. Johnson, P. A. Gade, and Allyn Hertzbach. *The Army Enlistment Decision: An Overview of the ARI Recruit Surveys, 1982 and 1983*. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, ADA164230, 1984.

Elster, Richard S. "Accession Workshop Report." In *Conference Proceedings: Naval Manpower Research in the 1980's*, ed. Stanley A. Horowitz, 42-44. Alexandria, VA: Center for Naval Analyses, CNA Report 58, 1982.

Fernandez, Judith C., and Dennis De Tray. *Sources and Characteristics of Prior Service Accessions: Evidence from One Cohort*. Santa Monica, CA: RAND, N-2064-MIL, 1984.

Fernandez, Richard L. *Enlistment Effects and Policy Implications of the Educational Assistance Test Program*. Santa Monica, CA: RAND, R-2935-MRA, 1982.

Fernandez, Richard L., Glenn A. Gotz, and Robert M. Bell. *The Dynamic Retention Model*. Santa Monica, CA: RAND, N-2141-MIL, 1985.

Ferree, William D. *SWOTOURS: A Modification of an Interactive Computer Model to Analyze the Manpower Requirements of the Operational Tours of U.S. Navy Surface Warfare Officers*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA104126, 1981.

Fleming, Matthew G. *The Cost and Benefits of Reduced Manning for U.S. Naval Combatants*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA333453, 1997.

Fletcher, Jean W., and Kurt L. Giesler. *Relating Attitudes Toward Navy Life to Reenlistment Decisions*. Alexandria, VA: Center for Naval Analyses, CRC 454, 1981.

French, Gregory P. *OP-12/PERS-5 In the Manpower Process*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA246573, 1991.

Gates, Susan M., and Albert A. Robbert. *Comparing the Costs of DOD Military and Civil Service Personnel*. Santa Monica, CA: RAND, MR-980-OSD, 1998.

General Accounting Office (GAO). *Trends in Active Military Personnel Compensation Accounts for 1990-97*. Washington, DC: GAO/NSIAD-96-153, 1996.

_____. Report to Congressional Committees, *Force Structure: Streamlining Plans Could Enable Navy to Reduce Personnel Below FY 1999 Goal*. Washington, D.C.: NSIAD-97-90, April 1997.

_____. Report to the U.S. Senate Subcommittee on Personnel, *Military Attrition: DOD Needs to Better Understand Reasons for Separation and Improve Recruiting Systems*. Washington, D.C.: T-NSIAD-98-109, March 1998a.

_____. Report to the U.S. Senate Committee on Armed Service, Subcommittee on Personnel, Chairman and the Ranking Minority Member. *Military Attrition: Better Data, Coupled With Policy Changes, Could Help the Services Reduce Early Separations*. Washington, D.C.: GAO/NSIAD-98-213, September 1998b.

_____. Report to Congressional Requesters, *Military Personnel: Perspectives of Surveyed Service Members in Retention Critical Specialties*. Washington, D.C.: GAO/NSIAD-99-197BR, August 1999.

_____. *Military Personnel: Systematic Analyses Needed to Monitor Retention in Key Careers and Occupations*. Washington, D.C.: GAO/NSIAD-00-60, March 8, 2000a.

_____. Testimony before the U.S. House of Representatives Committee on Armed Services, Subcommittee on Military Personnel, *Military Personnel: Preliminary Results of DOD's 1999 Survey of Active Duty Members*. Washington, D.C.: GAO/T-NSIAD-00-110, March 8, 2000b.

_____. Testimony before the U.S. Senate Committee on Governmental Affairs, Subcommittee on Oversight of Government Management, Restructuring, and the District of Columbia Committee on Governmental Affairs, *Managing Human Capital in the 21st Century*. Washington, D.C.: GAO/T-GGD-00-77, March 9, 2000c.

_____. Performance and Accountability Series, *Major Management Challenges and Program Risks: Department of Defense*. Washington, D.C.: GAO-01-244, January 2001a.

_____. Report to the U.S. House of Representatives, Committee on Armed Services, Subcommittee on Military Personnel, Chairman and Ranking Minority Member, *Military Personnel: Perceptions of Retention-Critical Personnel Are Similar to Those of Other Enlisted Personnel*. Washington, D.C.: GAO-01-785, June 2001b.

_____. Report to the U.S. Senate, Committee on Appropriations, Subcommittee on Defense, Chairman and Ranking Minority Member, *Military Personnel: Longer Time Between Moves Related to Higher Satisfaction and Retention*. Washington, D.C.: GAO-01-841, 2001c.

_____. Report to Congressional Requesters, *Military Personnel: First-Term Personnel Less Satisfied With Military Life Than Those in Mid-Career*. Washington, D.C.: GAO-02-200, December 2001d.

_____. Report to the U.S. Senate, Committee on Armed Services, Subcommittee on Personnel, *Active Duty Benefits Reflect Changing Demographics, But Opportunities Exist to Improve*. Washington, D.C.: GAO-02-935, September 2002.

Glaser, Dale N., and Joyce Shettel Dutcher. *Quality of Life: Literature Review and Recommendations for Measurement of Military Outcomes*. San Diego, CA: Navy Personnel Research and Development Center, NRPDC-TR-94-3, ADA276573, 1994.

Gray, Rosanna L. *Influences of High Quality Army Enlistments*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA180562, 1987.

Grissmer, David W. *The Accuracy of Simple Enlisted Force Forecasts*. Santa Monica, CA: RAND, N-2078-MIL, 1985.

Grissmer, David, Richard Eisenman, and William Taylor. *Defense Downsizing: An Evaluation of Alternative Voluntary Separation Incentives Payments to Military Personnel*. Santa Monica, CA: RAND, MR-171-OSD/A, 1995.

Goldberg, Matthew S. *Enlistment Supply: Past, Present, Future*. Alexandria, VA: Center for Naval Analyses, CNS 1168, 1982a.

_____. *Projecting the Navy Enlisted Force Level*. Alexandria, VA: Center for Naval Analyses, Professional Paper 343, 1982b.

_____. *New Estimates of the Effect of Unemployment on Enlisted Attrition*. Alexandria, VA: Center for Naval Analyses, ADA172661, 1985.

Goldberg, Matthew S., and John T. Warner. *Determinants of Navy Reenlistment and Extension Rates*. Alexandria, VA: Center for Naval Analyses, CRC 476, 1982.

Golding, Heidi L., Jeremy A. Arkes, and Martha E. Koopman. *Compensating the Sailor of the Future*. Alexandria, VA: Center for Naval Analyses, CRM 99-58, 1999.

Golfin, Peggy A., and Darlene H. Blake. *Tech Prep and the U.S. Navy*. Alexandria, VA: Center for Naval Analyses, CRM D0000399.A1, 2000.

Golfin, Peggy A., John D. White, and Lisa A. Curtin. *A Role for Community Colleges in Navy Training*. Alexandria, VA: Center for Naval Analyses, CRM 97-97. 1998.

Gotz, Glen A., and John J. McCall. *Estimating Military Personnel Retention Rates: Theory and Statistical Method*. Santa Monica, CA: RAND, R-2541-AF, 1980.

Hall, Gaineford J. Jr., and S. Craig Moore. *Uncertainty in Personnel Force Modeling*. Santa Monica, CA: RAND, N-1842-AF, 1982.

Hansen, Michael L. *Compensation and Enlisted Manning Shortfalls*. Alexandria, VA: Center for Naval Analyses, CRM D0001998.A2/Final, 2000.

Hansen, Michael L., and Jennie W. Wenger. *Why Do Pay Elasticity Estimates Differ?* Alexandria, VA: Center for Naval Analyses, CRM D0005644.A2, 2002.

Harrell, Margaret C., and Laura L. Miller. *New Opportunities for Military Women: Effects Upon Readiness, Cohesion, and Morale*. Santa Monica, CA: RAND, MR-896-OSD, 1997.

Harris, William E. *Military Compensation and the All-Volunteer Force: Lessons Learned*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA290172, 1994.

Hayes, James H. *The Evolution of Military Officer Personnel Management Policies: A Preliminary Study with Parallels from Industry*. Santa Monica, CA: RAND, R-2276-AF, 1978.

Hershey, Alan, Marsha Silverberg and Tom Owens. "The Diverse Forms of Tech-Prep: Implementation Approaches in Ten Local Consortia." Washington, D.C.: U.S. Department of Education, 1995. <http://www.ed.gov/pubs/Diverse/title.html> Accessed 30 December 2002.

Hix, William M., Herbert J. Shukiar, Janet M. Hanley, Richard J. Kaplan, Jennifer H. Kawata, Grant N. Marshall, and Peter J. E. Stan. *Personnel Turbulence: A Primer on Permanent Change of Station Moves*. Santa Monica, CA: RAND, MR-938, 1998.

Hodges, James S., and James A. Dewar. *Is It You or Your Model Talking? A Framework for Model Validation*. Santa Monica, CA: RAND, R-4114-AF/A/OSD, 1992.

Hosek, James. "Manpower." A chapter of a report entitled, *Project Air Force 1946-1996*. <http://www.rand.org/publications/PAFbook.pdf> Accessed November 30, 2002.

Hosek, James, and Christine Peterson. *Reenlistment Bonuses and Retention Behavior*. Santa Monica, CA: RAND, R-3199-MIL, 1985.

_____. *Serving Her Country: An Analysis of Women's Enlistment*. Santa Monica, CA: RAND, R-3853-FMP, 1990.

Hosek, James, and Jennifer Sharp. *Keeping Military Pay Competitive: The Outlook for Military Pay and Its Consequences*. Santa Monica, CA: RAND, IP-205, 2001.

Hosek, James R., John Antel, and Christine E. Peterson. *Who Stays, Who Leaves? Attrition Among First-Term Enlistees*. Santa Monica, CA: RAND, N-2967-FMP, 1989.

Junor, Laura, and Jessica Oi. *A New Approach to Modeling Ship Readiness*. Alexandria, VA: Center for Naval Analyses, CRM-95-239, 1996.

Kear, William James. *Surface Warfare Attrition: Does Ship Type Make a Difference?* Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA222017, 1989.

Kilburn, M. Rebecca, and Jacob Alex Klerman. *Enlistment Decisions in the 1990s: Evidence from Individual-Level Data*. Santa Monica, CA: RAND, MR-944-OSD/A, 1999.

Kilburn, M. Rebecca, Rachael Louie, and Dana P. Goldman. *Patterns of Enlisted Compensation*. Santa Monica, CA: RAND, MR-807-OSD, 2001.

Kirby, Sheila Nataraj, and Harry J. Thie. *Enlisted Personnel Management: A Historical Perspective*. Santa Monica, CA: RAND, MR-755-OSD, 1996.

Koopman, Martha E., and Heidi L. Golding. *Optimal Manning and Technological Change*. Alexandria, VA: Center for Naval Analyses, CRM 99-59, 1999.

Koopman, Martha E., Steve Cylke, Heidi L. W. Golding, Michael L. Hansen, and Thomas Husted. *Compensation Strategy for the Future Force*. Alexandria, VA: Center for Naval Analyses, CRM D0002082.A2, 2000.

Kostiuk, Peter F. *The Navy Manpower-Requirements System*. Alexandria, VA: Center for Naval Analyses, CRM 87-114, 1987.

Layne, Mary E., Scott Naftel, Harry Thie, and Jennifer H. Kawata. *Military Occupational Specialties: Change and Consolidation*. Santa Monica, CA: RAND, MR-977-OSD, 2001.

Larkin, James R. *The Use of Multiple Crews for a U.S. Navy Ship*. Newport, RI: Naval War College, Report of Chair of Physical Sciences to President, Naval War College, 10 September 1962.

Levy, Dina G., Harry Thie, Albert A. Robbert, Scott Naftel, Charles Cannon, Rudolph H. Ehrenberg and Matthew Gershwin. *Characterizing the Future Defense Workforce*. Santa Monica, CA: RAND, MR-1304-OSD, 2001.

Lewis, Philip M. *Family Factors and The Career Intent of Air Force Enlisted Personnel*. Maxwell Air Force Base, AL: Leadership and Management Development Center, ADA164899, 1985.

Lockman, Robert F. *Final Report of the Personnel Management in the All-Volunteer Force Study*. Alexandria, VA: Institute of Naval Studies, Center for Naval Analyses, 1980.

Marcus, Alan J. *Summary Report: Manning the 600-Ship Navy*. Alexandria, VA: Center for Naval Analyses, CRM 85-111.10, 1985.

May, Laurie J. *Alternative Modeling Approaches for Setting Cost-Effective Qualification Standards*. Center for Naval Analyses, CRM 87-54, 1987.

Manganaris, Alex G., and Chester E. Phillips. *The Delayed Entry Program: A Policy Analysis*. Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences, ADA167847, 1985.

Milch, Paul R. *FORECASTER, A Markovian Model to Analyze the Distribution of Naval Officers*. Monterey, CA: Naval Postgraduate School, ADA221670, 1990.

Mishoe, Keith B. *The Development of Prior Enlisted Midshipmen at the U.S. Naval Academy: An Analysis of the Effects of Prior Enlisted Service on Midshipmen Performance, Graduation and Fleet Retention*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA381386, 2000.

Moore, C. S., H. S. Griffis, and L. C. Cavalluzzo. *A Predictive Model of Navy Second-Term Retention*. Alexandria, VA: Center for Naval Analyses, CRM 95-245, ADA311091, 1996.

Murray, Michael P., and Laurie L. McDonald. *Recent Recruiting Trends and Their Implications for Models of Enlistment Supply*. Santa Monica, CA: RAND, MR-847-OSD/A, 1999.

Nakada, Michael K., and James P. Boyle. *Nuclear Officer Retention: An Economic Model*. San Diego, CA: Navy Personnel Research and Development Center, NRPDC-TN-96-25, 1996.

National Research Council. *Navy-21 Update: Implications of Advancing Technology for Naval Operations in the Twenty-First Century*. Washington, D.C.: ADA306545, 1993.

_____. Attitudes, Aptitudes, and Aspirations of American Youth: Implications for Military Recruiting. Paul Sackett and Anne Mavor, ed. Washington, D.C.: Division of Behavioral And Social Sciences and Education, National Academy Press, 2002.

Navy Personnel Research, Studies, & Technology. "Sailor 21." <http://www.nprst.navy.mil/Sailor.htm>. Accessed January 10, 2003.

Norton, Lee. *A Compendium of Navy and Marine Corps Decision Support Systems for Military Personnel Planning and Operations*. San Diego, CA: Navy Personnel Research and Development Center, NPRDC TN 89-26, ADA209871, 1989.

Orvis, Bruce R. *Relationship of Enlistment Intentions to Enlistment in Active Duty Services*. Santa Monica, CA: RAND, N-2411-FMP, 1986.

Orvis, Bruce R., and Beth J. Asch. *Military Recruiting: Trends, Outlook, and Implications*. Santa Monica, CA: RAND, MR-902-A/OSD, 2001.

Orvis, Bruce R., and Martin T. Gahart. *Enlistment Among Applicants for Military Service: Determinants and Incentives*. Santa Monica, CA: RAND, R-3359-FMP, 1990.

Orvis, Bruce R., Martin T. Gahart, Alvin K. Ludwig, and Karl F. Schutz. *Validity and Usefulness of Enlistment Intention Information*. Santa Monica, CA: RAND, R-3775-FMP, 1992.

Orvis, Bruce R., Michael T. Childress, and J. Michael Polich. *Effect of Personnel Quality on the Performance of patriot Air Defense System Operators*. Santa Monica, CA: RAND, R-3901-A, 1992.

Orvis, Bruce R., Narayan Sastry, and Laurie L. McDonald. *Military Recruiting Outlook: Recent Trends in Enlistment Propensity and Conversion of Potential Enlisted Supply*. Santa Monica, CA: RAND, MR-677-A/OSD, 1996.

Polich, J. Michael, James N. Dertouzos, and S. James Press. *The Enlistment Bonus Experiment*. Santa Monica, CA: RAND, R-3353-FMP, 1986.

President's Commission on an All-Volunteer Armed Force. *The Report of the President's Commission on an All-Volunteer Armed Force*. Washington, D.C.: U.S. Government Printing Office, 1970.

Pringle, Cedric. *Smart Gator: An Analysis of the Impact of Reduced Manning on the Mission Readiness of U.S. Naval Amphibious Ships*. Monterey, CA: U.S. Naval Postgraduate School, Student Thesis, ADA358792, 1998.

Quester, Aline, and Sarah Jeffries. *The History and Effectiveness of the Enlistment Bonus Program for Procuring Nuclear-Field Personnel*. Alexandria, VA: Center for Naval Analyses, ADA170881, 1985.

Robbert, A. L., Brent Keltner, Ken Reynolds, Mark Spranca, and Beth Benjamin. *Differentiation in Military Human Resource Management*. Santa Monica, CA: RAND, MR-838-OSD, 1997.

Rostker, Benard D. *Human Resource Models: An Overview*. Alexandria, VA: Center for Naval Analyses, Professional Paper 370, 1982.

Rothenberg, Jeff. *The Nature of Modeling*. Santa Monica, CA: RAND, N-3027-DARPA, 1989.

Secretary of Defense. Statement of Secretary of Defense Melvin R. Laird of March 9, 1971. *FY 1972-1976: Defense Program and the 1972 Defense Budget*. Washington, D.C.: U.S. Government Printing Office, 1971.

_____. Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics). *America's Volunteers: A Report on the All-Volunteer Armed Forces*. Washington, D.C.: Government Printing Office, December 31, 1978.

_____. *Report of the Secretary of Defense Caspar W. Weinberger to the Congress on the FY 1983 Budget, FY 1984 Authorization Request and FY 1983-1987 Defense Programs*. Washington, D.C.: DOD Printing Office, February 8, 1982.

_____. Report of the Secretary of Defense Les Aspin. *Report on the Bottom-Up Review*. Washington, D.C.: U.S. Government Printing Office, October 1993.

Smith, Keith E. *Cost Comparison of Technical School Versus Unit Training Methods for Direct-Duty Airmen in Civil Engineering Air Force Specialty Codes*. Wright-Patterson Air Force Base, OH: Air Force Institute of Technology, ADA174565, 1986.

Somer, Emanuel P. "Navy Personnel Survey System (NPSS)." In *Project Profiles*, ed. R. C. Sorenson, 27-28. San Diego, CA: Navy Personnel Research and Development Center, NPRDC-AP-91-16, 1991.

Sorenson, R. C., ed. *Project Profiles*. San Diego, CA: Navy Personnel Research and Development Center, NPRDC-AP-91-16, 1991.

Strategic Studies Group XX. *Making Education A Mission: A Report to the Chief of Naval Operations*. Newport, RI: Limited Distribution, For Official Use Only, April 2002.

Stolzenberg, Ross, M., and John D. Winkler. *Voluntary Terminations from Military Service*. Santa Monica, CA: RAND, R-3211-MIL, 1983.

Thie, Harry and Christine Fossett. *Military Recruiting and Retention for the 21st Century Mini Symposium Proceedings, 27-30 September 1999*. Alexandria, VA: Military Operations Research Society, MORS, 2000. Report in pdf format online at <http://www.mors.org/reports.htm> Accessed January 10, 2003.

Thie, Harry, J., and Jefferson P. Marquis. *The Present Military Personnel Management Framework: Where It Came From*. Santa Monica, CA; RAND, PM-1247-OSD, 2001.

Thie, Harry, Margaret C. Harrell, Roger Brown, Clifford Graf, Mark Berends, Claire Mitchell Levy, Jerry M. Sollinger. *A Future Officer Career Management System: An Objectives-Based Design*. Santa Monica, CA: RAND, MR-788-OSD, 2001.

Thirtle, Michael R., *Educational Benefits and Officer-Commissioning Opportunities Available to U.S. Military Servicemembers*. Santa Monica, CA: RAND, MR-981-OSD, 2001.

Van Larr, Colette. *Increasing a Sense of Community in the Military: The Role of Personnel Support Programs*. Santa Monica, CA: RAND, MR-1071, 1999.

Walker, Warren. *Public Policy Analysis: A Partnership Between Analysts and Policymakers*. Santa Monica, CA: RAND, P-6074, 1978.

Ward, Michael P., and Hong W. Tan. *The Retention of High-Quality Personnel in the U.S. Armed Forces*. Santa Monica, CA: RAND, R-3117-MIL, 1985.

Warner, John T. *Military Compensation and Retention: An Analysis of Alternative Models and a Simulation of a New Retention Model*. Alexandria, VA: Center for Naval Analyses, Institute for Naval Studies Research Contribution 436, 1981.

_____. “Navy Manpower Issues.” In *Conference Proceedings: Naval Manpower Research in the 1980's*, ed. Stanley A. Horowitz, 5-11. Alexandria, VA: Center for Naval Analyses, CNA Report 58, 1982

Warner, John T., and Bruce Simon. *An Empirical Analysis of Pay and Navy Enlisted Retention in the AVF: Preliminary Results*. Alexandria, VA: Center for Naval Analyses, Professional Paper 392, 1979.

Warner, John T., and Matthew S. Goldberg. *The Influence of Non-Pecuniary Factors on Labor Supply*. Alexandria, VA: Center for Naval Analyses, Professional Paper 337, 1981.

Wilcove, G. L. *Enlisted Men's and Officers' Opinions of Recent Policy Changes Implemented Through Z-Grams*. Washington, D.C.: Naval Personnel Research and Development Laboratory, WSR 72-5, 1971.

Wild, William G., and Bruce R. Orvis. *Design of Field-Based Crosstraining Programs and Implications for Readiness*. Santa Monica, CA: RAND, R-4242-A, 1993.

Williamson, Stephanie. *A Description of U.S. Enlisted Personnel Promotion Systems*. Santa Monica, CA: RAND, MR-10667-OSD, 1999.

Winkler, John D., and Paul Steinberg. *Restructuring and Consolidation of Military Education and Training*. Santa Monica, CA: RAND, MR-850-A/RC, 1997.

Wohl, Joseph G., John A. Nagay, and Franklin V. Taylor. *Human Engineering in the U.S. Navy: A Study by the Working Group in Human Engineering*. Washington, D.C.: U.S. Office of Naval Research, 1953.

Zumwalt, Elmo R., Jr. *The Navy N: Integration of Men and Mission*. Washington, D.C.: U.S. Government Printing Office, 700-917/20044, 1972.

Articles

Asch, Beth J., and John T. Warner. "A Theory of Compensation and Personnel Policy in Hierarchical Organizations with Application to the United States Military." *Journal of Labor Economics* 19, no. 3 (2001): 523-563.

Ash, C., B. Udis, and R.F. McNown. "Enlistments in the All-Volunteer Force: A Military Personnel Supply Model and its Forecasts." *American Economic Review* 73 (1983): 144-55.

Baldwin, Robert H., and Thomas V. Daula. "The Cost of High-Quality Recruits." *Armed Forces & Society* 11, no. 1 (1984): 96-114.

Bartel, A.P., and Lichtenberg, F.R. "The Comparative Advantage of Educated Workers in Implementing New Technology." *Review of Economics and Statistics*, 69 no. 1 (1987): 104-120.

Berman, E., J. Bound, and S. Machin. "Implications of Skill-Biased Technological Change: International Evidence." *The Quarterly Journal of Economics*, 113 no. 4 (1998): 1245-1279.

Bernstein, D.S. "WBT: Are We Really Teaching?" *Inside Technology Training*, February 1998, 14-17.

Biddle, Stephen. "Victory Misunderstood: What the Gulf War Tells Us About the Future of Conflict." *International Security* 21 no. 2 (Fall 1996) 139-179.

Brown, Charles W., and Charles C. Moskos. "American Volunteer Soldier: Will He Fight? A Provisional Attitude Analysis." *Military Review* 56, no.1 (Fall 1977): 30-35.

Carper, Richard L. "Authoritarian Management: Alive or Dead in the High Tech Environment?" *Logistics Spectrum* 29, no. 3 (Fall 1995): 32-36.

Cebrowski, Arthur K. and John J. Garstka. "Network-Centric Warfare: Its Origin and Future." *U.S. Naval Institute Proceedings* 124, no. 1 (1998): 28-35.

Chambers, Elizabeth G., Helen Handfield-Jones, Steven Marc Hankin, and Edward G. Michaels III. "Win the War for Top Talent." *Workforce* 77, no. 12 (Dec 1998): 50-56.

Cohen, Eliot A. "Defending America in the Twenty-First Century." *Foreign Affairs* 79, no. 6 (Nov/Dec 2000): 40-56.

Cooke, Timothy W., and A. Quester. "What Characterizes Successful Enlistees in the All-Volunteer Force: A Study of Male Recruits in the U.S. Navy." *Social Science Quarterly* 72 (1992): 238-252.

Dandeker, Christopher. "The Military in Democratic Societies." *Society* 38, no. 6 (Sep/Oct 2001) 16-24.

Daula, Thomas V., and D. Alton Smith. "Are High Quality Personnel Cost-effective? The Role of Equipment Costs." *Social Science Quarterly* 73 (1992): 266-275.

DeBoer, Larry and B. Wade Brorsen. "The Demand for and Supply of Military Labor." *Southern Economic Journal* 55, no. 4 (Apr 1989) 853-870.

Fletcher, Jean W. "Tradition, Technology and the Changing Roles of Women in the Navy." *Minerva*, Fall/Winter 1993, 57-85.

Fricker, Ronald D. "Keep the Best." *U.S. Naval Institute Proceedings* 123, no. 1 (January 1997): 50-55.

Fukuyama, Francis. "The End of History." *National Interest* 16 (Summer 1989): 3-18.

Gass, S.I. "Decision-aiding Models: Validation, Assessment, and Related Issues for Policy Analysis." *Operations Research* 31 (1983): 603-31.

Gilbert, Ronald G. "Human Resource Management Practices to Improve Quality: A Case Example of Human Resource Management Intervention in Government." *Human Resource Management* 30, no. 2 (1991): 183-198.

Gilpatrick, Eleanor. "Education for Work: A Full Employment Strategy." *The Annals of The American Academy of Political and Social Science* 418 (March 1975): 147-155.

Goldsmith, Edward. "Technology Transfer." *The Ecologist* 22, no. 4 (July/August 1992): 165-94.

Gregory, Robin, and Ralph L. Keeney. "Creating Policy Alternatives Using Stakeholder Values." *Management Science* 40, no. 8 (August 1994): 1035-1048.

Hale, Robert F. "Reducing Workload Through Technology." *Armed Forces Comptroller* 44, no.1 (Winter 1999): 13-14.

Hom, P.W., and C. L. Hulin. "A Competitive Test of the Prediction of Reenlistment by Several Models." *Journal of Applied Psychology* 66 (1981): 23-29.

Huntington, Samuel P. "After Containment: The Functions of the Military Establishment." *The Annals of the American Academy of Political and Social Sciences* 406 (March 1973): 1-16.

Janowitz, Morris. "The Social Demography of the All-Volunteer Armed Force." *The Annals of The American Academy of Political and Social Sciences* 406 (March 1973): 86-93.

Keeney, Ralph L. "Structuring Objectives for Problems of Public Interest." *Operations Research* 36, no. 3 (May-June 1988): 396-405.

Keeney, Ralph L., Detlof von Winterfeldt, and Thomas Eppel. "Eliciting Public Values for Complex Policy Decisions." *Management Science* 36, no. 9 (September 1990): 1011-1030.

Kirkwood, C. W., and R. K. Sarin. "Preference Conditions for Multiattribute Value Functions." *Operations Research* 28 (1980): 225-32.

Korb, Lawrence J. "Are U.S. Forces Unprepared and Underfunded? Fact and Fiction." *Naval War College Review* 55, no. 2 (Spring 2002): 29-42.

Krepinevich, Andrew F. "Cavalry to Computer: The Pattern of Military Revolutions." *The National Interest* 37 (Fall 1994): 30-42.

Lacy, James L. "Whither the All-Volunteer Force?" *Yale Law & Policy Review* 5, no. 1, (Fall/Winter 1986): 38-72.

Lehman, John. "The Six Hundred Ship Navy." *Defense*, January/February 1986, 14-21.

Leigh, D. and A. Gill. "Labor Market Returns to Community Colleges." *The Journal of Human Resources*, 32 no. 2 (1997): 334-353.

Levinson, Eliot, and Barbara Grohe. "Techno-Inequality In Our Schools." *Converge* 4 no. 10 (October 2001): 54-56.

Mare, Robert D., Christopher Winship, and Warren N. Kubitschek. "The Transition from Youth to Adult: Understanding the Age Pattern of Employment." *American Journal of Sociology* 90 (1984): 326-358.

McDaniel, Michael A., Frank L. Schmidt, and John E. Hunter. "Job Experience Correlates of Job Performance." *Journal of Applied Psychology* 73, no. 2 (1988): 327-330.

Moskos, Charles C. "The American Dilemma in Uniform: Race in the Armed Forces." *The Annals of the American Academy of Political and Social Sciences* 406 (March 1973a): 94-106.

_____. "The Emergent Military." *Pacific Sociological Review* 16 (April 1973b): 255-279.

_____. "What Ails the All-Volunteer Force: An Institutional Perspective." *Parameters* 31 no. 2 (Summer 2001): 29-47.

Murray, Williamson. "Thinking About Revolutions in Military Affairs." *Joint Forces Quarterly*, Summer 1997, 69-76.

Newitt, Jane. "Looking For a Few Good Men." *American Demographics* 10, no. 6 (Jun 1988) 30-34.

Philpott, Tom. "The Sailor's Admiral." *The Washingtonian* (February 1995), reprint, *Reader's Digest* 147, no. 880 (August 1995): 118-123.

Rowe, Greg D. "What Happened to the Pyramid?" *U.S. Naval Institute Proceedings* 123, no. 7 (July 1997): 80-81.

Rosen, Sherwin. "The Military as an Internal Labor Market: Some Allocation, Productivity, and Incentive Problems." *Social Science Quarterly* 73, no. 2 (1992): 227-237.

Smith, Gregory. "Simple Rewards are Powerful Motivators." *HR Focus* 78 (Aug 2001): 10-11.

Starry, Donn A. "Running Things." *Parameters* 17, no. 3 (Sep 1987): 13-20.

Steel, Robert P. "Labor Market Dimensions as Predictors of the Reenlistment Decisions of Military Personnel." *Journal of Applied Psychology* 81, no. 2 (1996): 421-28.

Stratton, Matt. "Smart Soldiers." *Harvard International Review* 20, no. 4 (Fall 1998): 10-11.

Timmerman, Frederick W. "Future Warriors." *Military Review* 67, no. 9 (Sep 1987): 46-55.

Vollrath, Frederick E. "Human Resource Management for the Total Force." *Army* 47, no. 10 (October 1997): 135-6.

Warner, John, and Matthew Goldberg. "The Influence of Non-Pecuniary Factors on Labor Supply: The Case of Navy Enlisted Personnel." *Review of Economics and Statistics* 66, no. 1 (1984): 26-35.

Warner, John T., and Saul Pleeter. "The Personal Discount Rate: Evidence from Military Downsizing Programs." *American Economic Review* 91 (March 2001): 33-54.